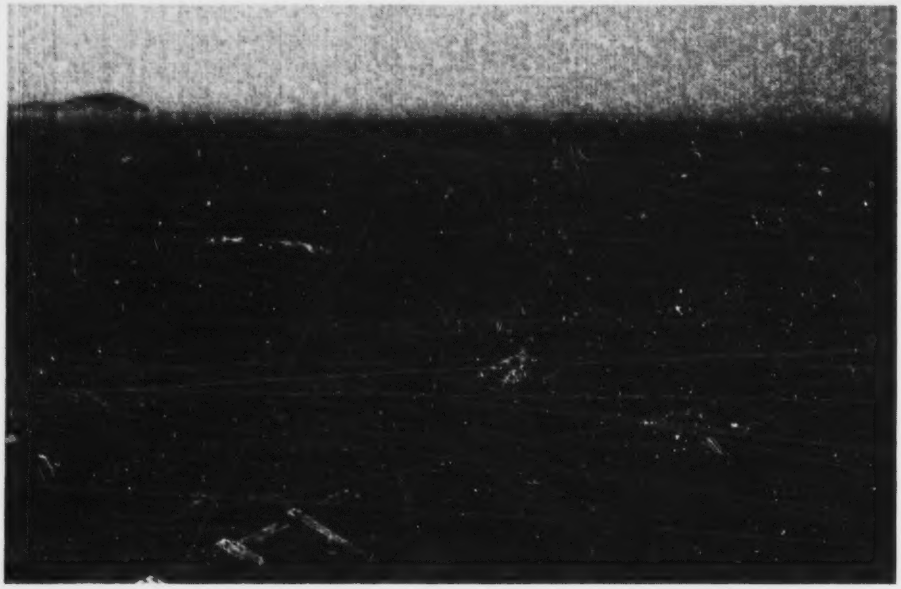
The Pre-Contact Archaeology of the Grand Manan Archipelago: Cultural History and Regional Integration

by
Susan Blair



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Susan E. Blair

1999

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ABSTRACT

The Grand Manan Archipelago, New Brunswick, is a cluster of islands at the nexus of the Bay of Fundy and the Gulf of Maine marine systems. The goals of this research are to assemble existing information about the prehistory of the Grand Manan Archipelago, to construct a prehistoric cultural history, and to integrate this information into a regional perspective.

The research involved collections analysis, survey and excavations. Private and public collections reveal traces of Native habitation extending from the Middle Archaic through the Late Maritime Woodland periods. The Baird site (BdDq-3) is an extensive, shallow, shell-bearing site containing several Maritime Woodland and historic period components. The Newton's Point site (BeDq-11), a shell-free coastal site, produced cultural material dating to the Late Maritime Woodland period. In addition, several previously unrecorded archaeological sites were identified but not excavated.

This research shows that the Grand Manan Archipelago was not peripheral to Native American occupation in the Maine/Maritimes area, as had been previously inferred. Archaeological evidence from the archipelago is similar to comparably-dated evidence elsewhere in the area. However, traditional methods of evaluating regional interaction, through the identification of patterns of lithic exchange, were found to be problematic. The discovery on Grand Manan Island of silicified volcanics

SOMMAIRE

L'archipel Grand Manan, au Nouveau-Brunswick, est un regroupement d'îles à la jonction des systèmes marins de la baie de Fundy et du golfe du Maine. Cette recherche a pour but de rassembler l'information déjà existante à propos de la préhistoire de l'archipel Grand Manan, d'élaborer une histoire culturelle préhistorique et d'intégrer l'information recueillie à l'échelle régionale.

La recherche a nécessité l'analyse des collections, des levés et des fouilles. Les collections privées et publiques ont démontré la présence d'autochtones à partir de la période archaïque moyenne jusqu'à la fin de l'époque des forêts-parcs des Maritimes. Le site Baird (BdDq-3) est vaste, peu profond, composé de différentes couches et contenant plusieurs éléments de l'époque des forêts-parcs des Maritimes et des périodes historiques. Le site de Newton's Point (BeDq11), un site côtier sans couches, contient du matériel culturel datant de la fin de l'époque des forêts-parcs des Maritimes. De plus, on a identifié plusieurs sites archéologiques non répertoriés qui n'ont pas encore fait l'objet de fouilles.

Cette recherche confirme que l'archipel Grand Manan n'était pas périphérique à l'occupation des autochtones américains dans le secteur du Maine et des Maritimes, comme on le croyait auparavant. Les vestiges archéologiques de l'archipel sont semblables à d'autres vestiges de la même époque découverts ailleurs dans la région. Cependant, les méthodes traditionnelles

resembling those from the Minas Basin area of Nova Scotia may further complicate the interpretation of patterns of regional prehistoric exchange.

d'évaluation de l'interaction régionale, par l'identification de modèles d'échange lithique, se sont avérées problématiques. La découverte, sur l'île de Grand Manan, de pierres volcaniques silicifiées semblables à celles que l'on trouve dans la région du bassin Minas, en Nouvelle-Écosse, vient compliquer davantage l'interprétation des types d'échanges régionaux préhistoriques.

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by Susan Blair

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Chapter 1
INTRODUCTION

THE SCOPE OF THE STUDY

The purpose of this thesis is to compile all available data about the prehistoric archaeology of the Grand Manan archipelago, to use these data to construct a framework for prehistoric cultural history, to evaluate existing interpretations about Grand Manan prehistory, and to integrate these into a larger regional perspective. It is the intention of this work to facilitate the future development of more sophisticated narratives and explanations about Grand Manan's past, so as to achieve a greater understanding of the past activities and actions of Grand Manan's Native people.

Archaeological research indicates that the Maine/Maritimes area has supported human populations for over 10,000 years. However, within this area and time span, there is a great deal of variation in the quantity and quality of available archaeological information. The effect is of an archaeological mosaïc, with some regions, such as the Quoddy region (e.g., Black 1992; Sanger 1987), and the central coast of Maine (e.g., Bourque 1992, 1995) containing high site densities illuminated by long-term research and survey programs. Other regions, such as the southeastern coast of New Brunswick east of St. John, the northern portion of the coast of Maine, and the Grand Manan archipelago are very poorly represented by archaeological sites and research. It is this variation in available information that creates the effect of a mosaïc, which may have its source in:

(i) variable distribution of resources and ecological productivity,
(ii) variable rates of erosion and site destruction, or
(iii) uneven or ineffective survey and research strategies.

It has been assumed that the scarcity of archaeological resources in the Grand Manan Archipelago is the result of the first two factors. This project, however, demonstrates that a lack of research is culpable. The net result is that the Grand Manan archipelago has been neglected in the construction of cultural histories for the Maine/Maritimes area. This thesis challenges the notion that Grand Manan has little to offer the rich and complex cultural histories of the Maine/Maritimes area, and through the presentation of information about Grand Manan prehistory, pursues some of the resulting interpretive and narrative implications.

THEORETICAL ORIENTATION

The traditional goal of archaeology has been to gain an understanding of the past, and in particular, how people behaved in the past and how this behaviour changed over time.

Basic curiosity about the past is the impetus of this research. However, recent theoretical critiques (framed in the post-modern rubric) have attacked the proposition that the past is "knowable" using positivist scientific theories and methods. These critiques suggest that interpretations of the past are merely the projection of self by researchers into narratives about the past. In this way, the act of doing archaeology charges all aspects of archaeological material and analysis with meaning (Hodder 1986; Trigger 1989). These critiques carry with them some logical weight; after all, the factual foundation which supports so many interpretations is small, and these interpretations often vary from researcher to researcher, and change from year to year and from generation to generation. It is now generally accepted that some very important and interesting components of the past are less "knowable" than others. A further post-processual critique that is levelled against positivist approaches is that these less knowable components, especially those derived from the ideological realm, are fundamental sources of physical manifestations of action in the past. Contrary to the processual/positivist perspective, which views human behaviour as circumscribed by a material reality, the post-processual critique has put forth the proposition that reality is a construction of human mental processes; in it's extreme, this proposition implies that any meaning within the archaeological record has been lost with the loss of the minds that created it.

The fundamental goal of this research is to assemble basic information about the activities and behaviour of prehistoric people on the Grand Manan archipelago, and to use this information to construct a framework for a cultural history narrative. I am employing positivist theoretical and methodological approaches, predicated on the assumption that there was a past that is researchable. However, I consider the more moderate components of the post-modern critique to be an important consideration, particularly as the research exercise proceeds from archaeological data, through analysis to interpretation. I prefer to view the research process as dendritic rather than unilineal, with many possible outcomes leading to many possible interpretations rather than a single "correct" interpretation. Following this analogy, I accept and expect that there are many different narratives and explanations that can develop from the archaeological record. In this thesis, I will develop a framework for interpreting Grand Manan's prehistoric past, and explore the implications and avenues for narratives that this framework suggests to me.

BOUNDARIES

The Grand Manan archipelago (GMA) is a large island group at the nexus of the Bay of Fundy and the Gulf of Maine marine systems (Figure 1.1, Figure 1.2). It is a part of the Maine/Maritimes cultural area (e.g., Sanger 1974), which includes coastal portions of Maine, southern New Brunswick and southwestern Nova Scotia (Black 1992: 1). In this thesis, I restrict my discussion to the Maine/Maritimes region, although recent research has defined a larger cultural area, the Maritime Peninsula (Bourque 1994; Chalifoux and Burke 1995). The Maritime Peninsula is bounded to the south by the Gulf of Maine, to the north by the Gulf of St. Lawrence, to the west by the Chaudière River (Québec) and the Kennebec River, Maine (Bourque 1994: 23), and to the east by the Atlantic Ocean. Although the contextualization of regional information into this larger area is an important endeavour, it is beyond the scope of this research.

As an island group which is physically

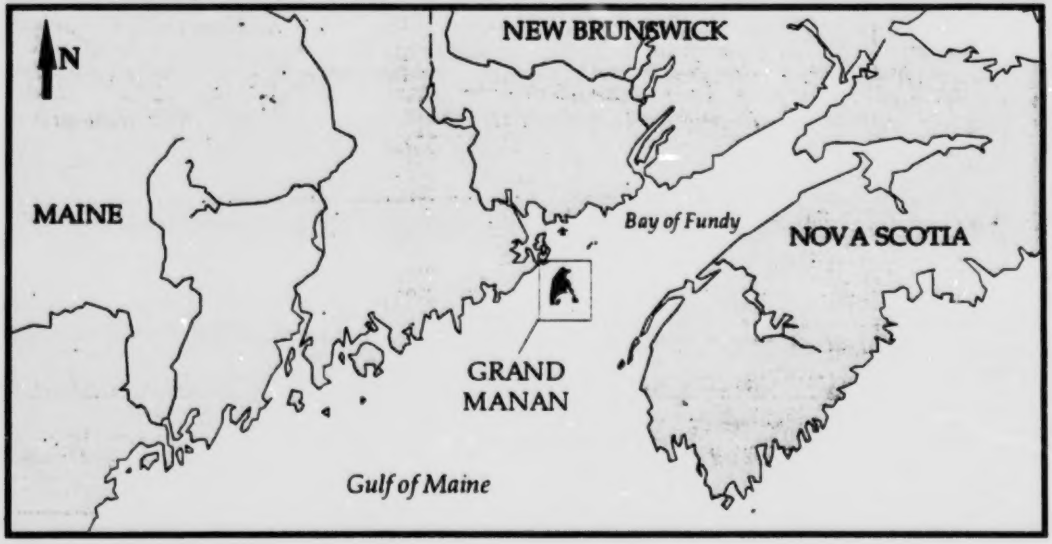
isolated from the mainland, the Grand Manan archipelago is easily bounded as a research area. However, coastal erosion is so significant a factor in the Bay of Fundy that the literal boundary cannot be placed at the high water line. To accommodate the changes in shorelines and their impact on sites, and to account for eroded materials (inter- and sub-tidal archaeological finds), the actual research universe must include not only the surface of the archipelago, but also the shallow waters around it. The archipelago itself rests on a shelf that rises abruptly from the ocean floor; the waters in and around the islands on the shelf are no deeper than 10 fathoms (18.5 metres), but rapidly drop off to a depth of over 90 metres at its edge. This natural shelf provides a convenient limit to the absolute research universe.

MODELS AND TERMINOLOGY

The Maritime Peninsula has been settled by humans for at least 11,000 years, when glacial ice receded, exposing wide, tundra-like expanses of open land in Nova Scotia, southern New Brunswick and Maine (Bonnichsen, Keenlyside and Turnmire 1991: 13; Turnbull 1974). Archaeologists have approached this long time frame in a practical fashion, by dividing it into a series of shorter time periods, based on visible and presumably significant changes in material culture.

At the most basic level, all of the human past can be divided into the prehistoric or the historic. Both literally and in archaeological usage, history refers to accounts of the past based on written records. The written word represents an active, individual voice, and it fundamentally alters the ways that archaeologists perceive and interpret the past. The prehistoric past refers specifically to times in which written records were either not kept, or have not survived. Although this dividing line seems very distinct, it is frequently difficult to apply it precisely. For example, in the Americas, the transition from prehistoric to historic occurred locally, sometimes coinciding with European contact, in other

***Figure 1.1**: The Maine/Maritimes area, showing modern boundaries, and the Grand Manan Archipelago*



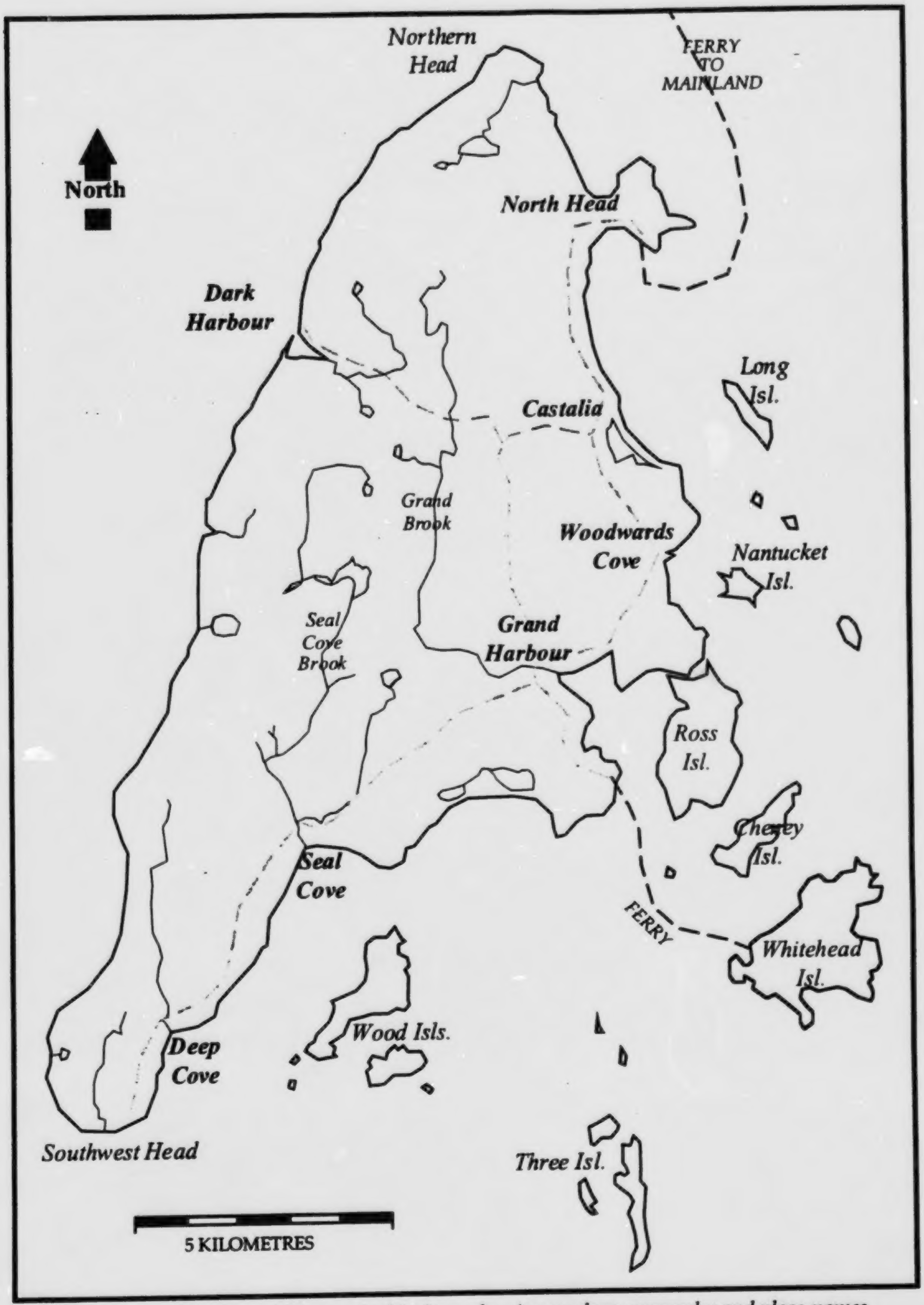

Northern Head
FERRY TO MAINLAND
North
North Head
Dark Harbour
Long Isl.
Castalia
Grand Brook
Woodwards Cove
Nantucket Isl.
Seal Cove Brook
Grand Harbour
Ross Isl.
Cheney Isl.
Seal Cove
FERRY
Whitehead Isl.
Wood Isls.
Deep Cove
Southwest Head
Three Isl.
5 KILOMETRES

Figure 1.2: Map of the Grand Manan Archipelago, showing modern geography and place-names.

places preceding or lagging behind it. Furthermore, because the written record is idiosyncratic, in that it represents the visions and experiences of specific individuals, portions of a society may remain prehistoric long after some parts of it are described through historical texts. The term "protohistoric" is sometimes used to address this ambiguity. In the Maine/Maritimes area, researchers generally consider the protohistoric period to begin around 500 years ago (Black 1992; Whitehead 1991: 235), with the historic period commencing 300 to 400 years ago (Figure 1.3).

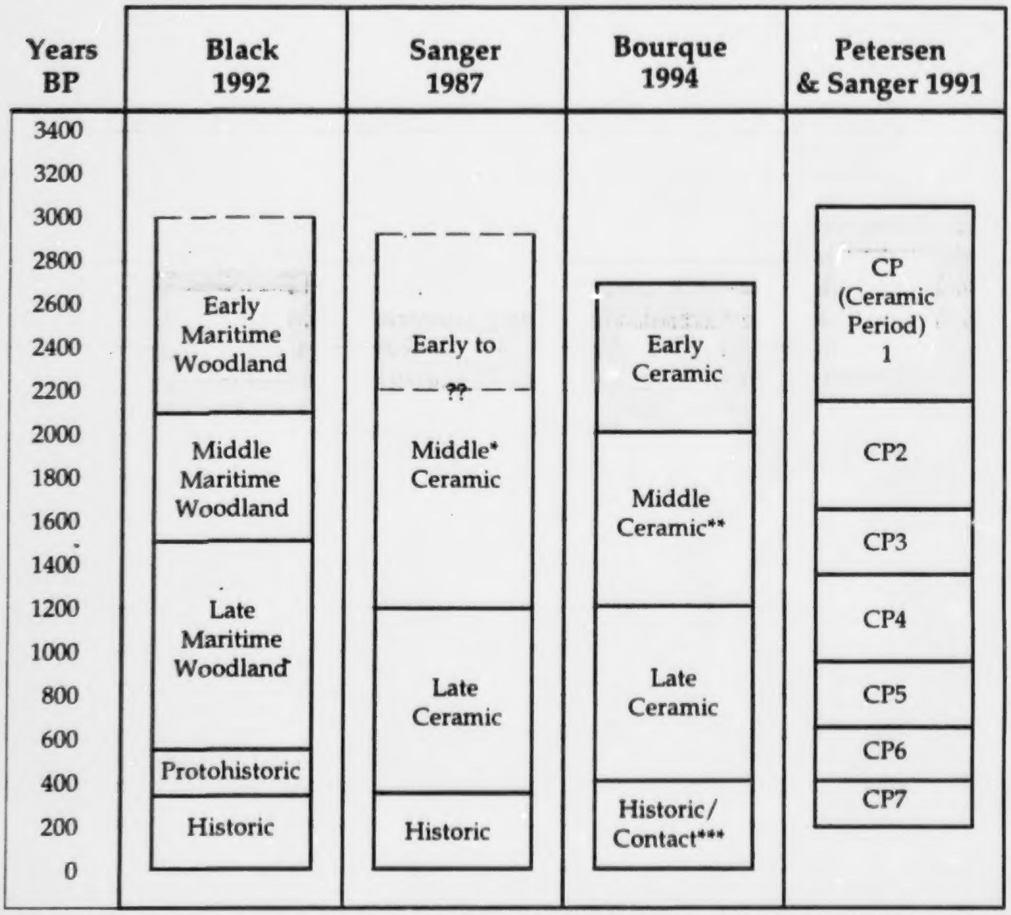
The prehistoric era in the Maine/Maritimes area, being over 20 times longer than the historic era and much less well-known, has been far more problematic to subdivide. At the largest and most accepted scale, the prehistoric era has been divided into three periods: the Paleoindian period (ca. 11,000 to ca. 9000 bp), the Archaic period (ca. 9000 to 3000 bp), and the Woodland or Ceramic period (ca. 3000 to ca. 500 bp) . However, even at this scale there is considerable debate as to the appropriate terminology and chronology.

The definition and dating of the Paleoindian period, due in part to temporal distance and scale and to a distinctive paleoenvironmental setting and material culture, is perhaps less contentious than later periods (for a more complete discussion, see Bonnichsen, Keenlyside and Turnmire 1991; Keenlyside 1993). In the Maritime Peninsula, the time period following the Paleoindian, from 9000 bp to the beginning of the protohistoric period (500 bp), has been broken down into two periods: the Archaic (or much less frequently, the Aceramic period, ca. 9000 to ca. 3000 bp), and the Ceramic or Woodland period (ca. 3000 to ca. 500 bp). A Transitional period, between ca. 4000 bp and 3000 bp is often applied to the interface between these two broad periods, a practical measure to address an enigmatic interval. Most of the terminological confusion focuses on the treatment of the latter period. The "Woodland" terminology developed in the midwestern United States, where it has been associated with a wide range of traits, most notably horticulture, ceramic production and mortuary ceremonialism (Bourque 1995). The broad application of the term to the Maine/Maritimes area, and its implied cultural associations has been questioned (Bourque 1995; Leonard 1995; Sanger 1974, 1979; Snow 1980), and has resulted in the creation of new terminologies, such as Horticultural period (Snow 1980), and more specifically in the Maritime Peninsula, Ceramic period (Bourque 1992, 1995). However, the use of ceramics as an identifying characteristic is not entirely satisfactory, as ceramics do not occur on all "Ceramic period" sites, and may have enjoyed only periodic popularity in usage (Petersen and Sanger 1991: 157). As Leonard (1995: 21) suggests, "...naming a time period after a prominent category of material culture implicitly establishes that category as preeminent, creating analytical bias". This is particular relevant in the Grand Manan archipelago. To date, the entire prehistoric ceramic assemblage from the archipelago consists of two small sherds, with a combined weight of 2.5 grams.

Keenlyside (1983) has proposed the use of the term "Maritime Woodland", and this terminology has been adopted by some Maine/Maritimes researchers (Black 1992). This term avoids making one element paramount, while differentiating the Maritime Peninsula culture area from the broader Northeast. The term is fitting, because as Black suggests, a maritime orientation is perhaps the most fundamental unifying characteristic in the region: "... all parts of the Maritimes are close to the sea, and maritime subsistence practices may have been undertaken by most prehistoric populations..." (Black 1992: 17). This terminology is more suited to the Grand Manan archipelago than any others that have been proposed, and will be adopted in this research.

The terminological complexities in the archaeological literature of the Maine/ Maritimes area are reflected in the interpretations and divisions that are proposed for the Maritime Woodland period (Figure

Figure 1.3: Culture history schemes and terminology for the Maine/Maritimes region.


Years BP
Black 1992
Sanger 1987
Bourque 1994
Petersen & Sanger 1991
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Early Maritime Woodland
Middle Maritime Woodland
Late Maritime Woodland
Protohistoric
Historic
Early to
??
Middle* Ceramic
Late Ceramic
Historic
Early Ceramic
Middle Ceramic**
Late Ceramic
Historic/ Contact***
CP (Ceramic Period) 1
CP2
CP3
CP4
CP5
CP6
CP7

* Sanger does not directly date the transition from his Early to Middle Ceramic, but he suggests in his discussion of the Minister's Island site that the Middle Ceramic occupation of that site could date to "as early as 1500 to 2200 BP" (Sanger 1987: 109).

** The Middle Ceramic period is inferred by Bourque (1994) by the gap between his Early Ceramic and his Late Ceramic.

*** Bourque (1994) places the Contact period specifically between AD 1580 and 1620.

1.3). Black's model (1992), as proposed for the insular Quoddy region, is derived from structural changes in stratified shell middens. The model proposed by Petersen and Sanger (1991) for the Maritime Peninsula is based entirely on changes in the frequency of ceramic attributes and types over time. Both of these models are directly anchored in radiocarbon dates, and serve to illustrate how interpretations of overall change are influenced by perspective and different data subsets. The shift from Middle to Late Maritime Woodland period is particularly important to this research, as it is during the Late Maritime Woodland (LMW) that there is the strongest evidence for economically-based regional interaction (Bourque 1994). It is important to recognize that the boundaries between time periods are both fluid and arbitrary. In practice, interpretations fix temporal boundaries to general cultural traits, and in so doing, restrict narrative potential. An example is the association of patterns of lithic exchange with Late Maritime Woodland contexts; by fixing the boundary of the Late Maritime Woodland period, it is possible to restrict or exclude earlier material from the narrative.

GRAND MANAN ARCHAEOLOGICAL PROJECT

The Grand Manan Archaeology Project (GMAP) has been ongoing since the first structured modern archaeological survey, which was conducted in the summer of 1983. This initial phase (GMAP I) was directed by David Black on behalf of the New Brunswick Provincial Archaeology Branch (Black 1984). Phase II of the GMAP, conducted by myself, has been the foundation of the research presented in this thesis. GMAP II was funded by the NB Provincial Archaeology Branch (NB Dept. of Municipalities, Culture and Housing), and the Dept. of Anthropology, UNB. The background research (collections, archives, and survey work) was carried out in the two years leading up to 1995, and during the summer and fall of 1995. However, the bulk of the archaeological fieldwork for Phase II was conducted over 10 weeks in the summer of 1995, and consisted of both foot surveys for new sites, and testing and excavating several known sites. The immediate goals of GMAP II were:

(i) to collect and assemble any existing information of the archaeology of the Grand Manan archipelago,
(ii) to record new archaeological sites in the Grand Manan archipelago,
(iii) to excavate samples of material from known prehistoric archaeological sites on the Grand Manan archipelago, and
(iv) to evaluate the potential destructive agents threatening these sites.

Although the primary focus of the research in this second phase was the prehistoric period sites of Grand Manan, all historic and prehistoric archaeological resources were equally recorded and evaluated.

The goals of the GMAP II were achieved through a broad-based approach, which combined the analysis of existing archaeological collections, archival research, the soliciting of information from local people, foot surveys for sites and potential prehistoric resources, and the controlled excavation of archaeological deposits. These methods resulted in

(i) the analysis of private and public collections that had not been previously examined,
(ii) the collection of previously unrecorded anecdotal local accounts of archaeological resources,
(iii) the location of high-quality local cherts, with high prehistoric resource potential,

(iv) the recording of three previously unrecorded prehistoric sites, and

(v) the partial excavation of two prehistoric sites.

These activities have resulted in a significant body of archaeological information. This compilation, or data base, is the point of departure for the construction of a narrative framework.

HISTORY OF RESEARCH

The prehistory of the Maine/Maritimes area has been a focus of interest to scientists and collectors since before archaeology developed into an integrated formal discipline. Throughout the 19th and early 20th centuries, a series of men of science (and to my knowledge, they were exclusively men) explored archaeological sites and their contents in the Maine/Maritimes area. Most of these men had wide-ranging scientific interests, and the focus of their research was often the sampling (through avid collecting) of the range and variety of life manifested on earth. One of the most prominent 19th century scientists was Spencer F. Baird of the Smithsonian Institution. Over the course of several years, Baird explored a number of aboriginal "shell heaps" in southwestern New Brunswick, Maine, and New England, including several on Grand Manan. These early researchers, embedded as they were in a colonial worldview, viewed Native settlement as limited in duration and complexity, and largely resulting from the last few centuries before the arrival of Europeans to the New World (e.g., Baird 1881). However, these early explorations provide invaluable information about both destroyed and extant prehistoric archaeological sites, including their locations, their structures, and in some cases, their contents.

Although interest in the prehistoric archaeology of the Maine/Maritimes area continued through the 19th and 20th centuries, professional research in southern New Brunswick languished between the 1880's and the 1950's, when the R. S. Peabody Foundation, and later the Archaeological Survey of Canada funded several survey and research projects. These projects focused on the coast of Passamaquoddy Bay, in the Quoddy region, with the Grand Manan archipelago receiving only passing attention. In the 1970's, with the development of a New Brunswick provincial archaeology branch (Archaeological Services), a regional survey strategy led to a formal system of recording archaeological sites (Davis 1980). The expanding site data base began to attract researchers to the Canadian Quoddy region, who conducted long-term, site-based projects (Black and S. Blair 1993; c.f. Bishop 1983, Bishop and Black 1988, Black 1992; Hammon-Demma 1984). Grand Manan was one of the last large portions of the southwest coast of New Brunswick to be formally surveyed under this regional agenda (Black 1984). This was the first well documented and methodical survey of Grand Manan. This survey has since been designated as Phase I of the Grand Manan Archaeology Project (GMAP), of which the current research project is Phase II.

In general, the interpretive focus in the Maine/Maritimes area through the 1960's and 1970's was on developing local and regional cultural history sequences (Bourque 1992; Davis 1978; Sanger 1971, 1986, 1987). However, at the same time archaeologists became aware of evidence suggesting strong links between regions at various times in the past (Bourque and Cox 1981; Black 1992; Crotts 1984; Sanger 1987). The refinement and integration of narratives from regions of high archaeological productivity into wider frameworks, including the development of models of intra- and extra-regional interaction and exchange has become a major research focus in the late 1980's and 1990's (Black 1992; Black, Wilson and MacDonald 1996; Bourque 1994; Bourque and Cox 1981; Chalifoux and Burke 1995; Codere 1995; Crotts 1984; Doyle 1995; Keenlyside 1996; MacDonald 1994; Sanger 1987). However, the nature of the regional archaeological data base (the "archaeological mosaïc") impedes this process, making connections and comparisons among regions problematic.

GRAND MANAN IN THE REGIONAL CONTEXT

Much of the cultural history of the Maine/Maritimes area has been constructed using sites and sequences in either the Quoddy Region, or the central coast of Maine (especially the Penobscot estuary) (Figure 1.4). Individual sites from southwestern Nova Scotia, the Minas Basin, the mouth of the Saint John river, and the southern coasts of Maine and New England, have been used to flesh out a regional framework. Underlying this framework has been an implicit characterization of regions according to archaeological productivity, and from this, extrapolating the intensity of cultural activity. Yet models of regional interaction require archaeologists to consider potential trade routes between areas of high archaeological productivity that might pass through those with few or no known archaeological resources. In some cases, the inferences that are drawn from the lack of archaeological sites of little or no cultural activity has led researchers to construct elaborate schemes to explain why an obvious stopover on an obvious trade route, such as Grand Manan, was *not* used.

> *Shorter distances from Maine to Nova Scotia can be accommodated by going to Grand Manan Island and then to Nova Scotia (about 40 miles of open water)... A problem with the Grand Manan and land routes is the relative scarcity of the distinctive lithics in Washington County and Knox coastal sites... Based on our current state of knowledge, a direct route from the central Maine coast to southwestern Nova Scotia seems likely... (Sanger 1991: 56).*

In this case, the lack of archaeological material on Grand Manan has become a form of negative evidence. What is the basis for this impression of site scarcity? Compared to adjacent regions, Grand Manan has been undersurveyed, and none of its known archaeological sites were excavated before 1995. Obviously empirical evidence has not been the source of this impression. Instead, the assessment of the archaeological potential of Grand Manan appears to have been based on attributes such as its distance from the coast, and its superficial similarity to rugged segments of the mainland. The stretch of coast immediately adjacent to the Grand Manan archipelago (west and southwest), sometimes referred to as the Bold coast (Figure 1.4), has been characterized as follows:

> *West of the Lubec Narrows the character of the Washington County coast changes. The next major embayments are Machias Bay and Englishman Bay, a linear distance of about 50 km. With the exception of an occasional indentation, the coastline features steep bedrock cliffs, is exposed to ocean waves, and lacks the kinds of beaches favoured by the Native Peoples. In addition, intertidal exploitation zones*

> *are scarce. Together, this stretch of the coast was as inhospitable to the Native Peoples as it is to those whose livelihood depends upon the inshore and intertidal resources of today (Sanger 1987: 133).*

In some explanations of cultural affiliations and contacts, Grand Manan is considered as an extension of the Bold coast, as just another part of the barrier that must be avoided:

> *...while the Quoddy Region is separated from the Machias Bay area by a stretch of forbidding shoreline which would have been most unattractive to canoe using people, there are inland water routes that link Cobscook Bay with Machias Bay, and routes that connect Machias Bay with the West Grand Lake system (Sanger 1987: 133).*

These interpretations suggest that the vessels available to Native travellers, likely birch-bark canoes in the Late Maritime Woodland and Protohistoric periods, would have been inadequate for anything other than paddling along friendly coastlines, and amongst near-shore islands. Indeed, Sanger (1987: 119) continues his discussion of extra-regional contact with this assessment of the marine capabilities of prehistoric canoes and canoeists:

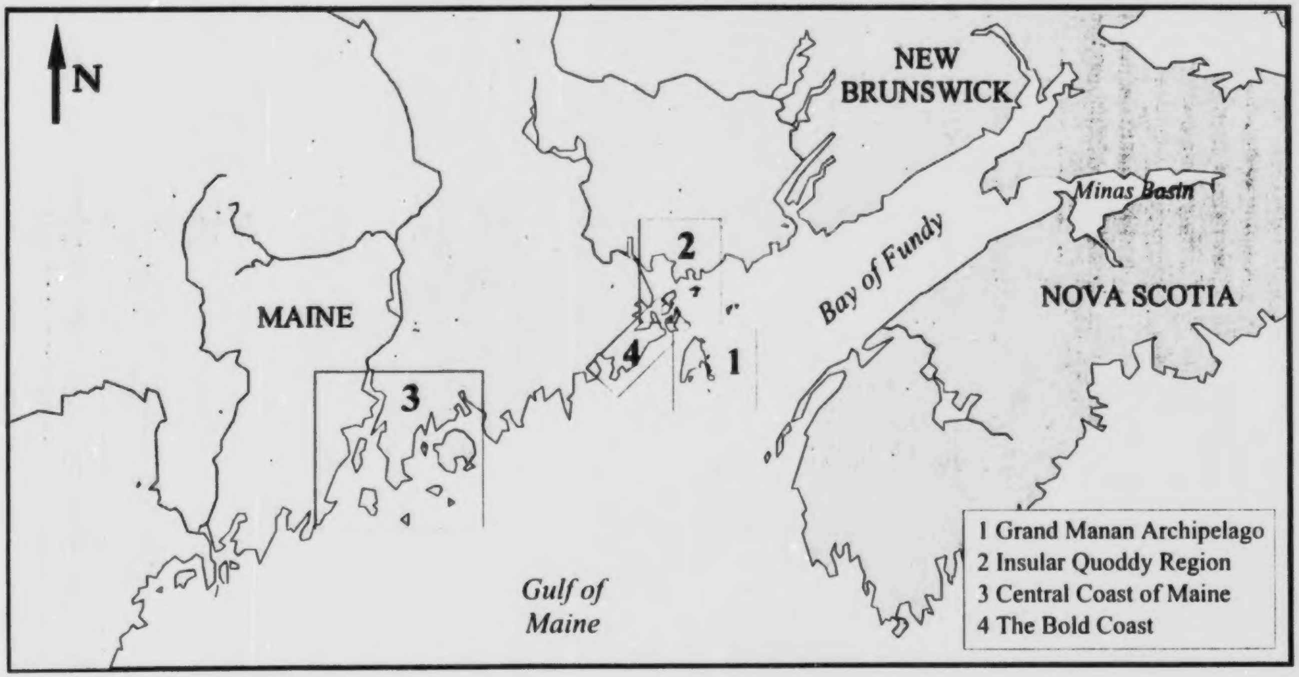
> *Wise canoeists would not venture very far offshore, however, because they would loose the protection afforded by the lee of the land... During the colder months, precisely those months that many of the Late Ceramic Period sites were occupied, the length of human survival in the case of a capsized canoe would be measured in minutes (Sanger 1987: 119).*

These explanations ignore the fact that Passamaquoddy people, whose ancestors occupied the southwestern coast of New Brunswick and the northern coast of Maine (and are thus the focus of this study), were renowned in the historic period as sea-mammal hunters and canoeists, who ventured far from shore in pursuit of porpoise. Whole communities of Passamaquoddys made annual visits to Grand Manan in fully-loaded canoes (Ganong 1983: 12; Gesner 1981: 19). Indeed, the mobility and marine skills of the historic period Passamaquoddys, combined with the archaeological evidence for widespread cultural interaction and exchange in the Late Archaic, Early and Late Maritime Woodland periods, suggest that the Grand Manan archipelago was potential location for the cultural activity of coastal foragers, either as a midpoint on coastal travel routes, or as a place where local people could participate in or interact with regional networks.

OUTLINE

Grand Manan has been a poorly understood piece of the archaeological mosaïc of the Maine/Maritimes area. This thesis presents and integrates information to amend this situation. In chapter 2, background information essential to contextualizing the prehistory of the Grand Manan archipelago is presented. Geological and biogeographical resources, and the existing evidence of prehistoric activity in the Grand Manan archipelago (previous archaeological research and ethnohistory) provide a context for information presented in later chapters. In chapter 3, the methods used to assemble information about the Grand Manan archipelago, and the data that resulted are discussed. These methods were broad-based, and incorporated the recording of local oral accounts, the analysis of

Figure 1.4: The archaeological mosaic of the Gulf of Maine, showing areas mentioned in the text


N
NEW BRUNSWICK
Minas Basin
Bay of Fundy
NOVA SCOTIA
MAINE
2
4
1
3
Gulf of Maine
1 Grand Manan Archipelago
2 Insular Quoddy Region
3 Central Coast of Maine
4 The Bold Coast

private and public artifact collections, survey for previously unrecorded sites and geological resources, and excavation. In chapter 4, the discussion of the results of the 1995 fieldwork is narrowed to the two excavated archaeological sites, Newton's Point (BeDq-11) and the Baird site (BdDq-3). These sites contain Middle and Late Maritime Woodland components, which produced artifacts, debitage, and features. In chapter 5, the information presented in the previous two chapters is integrated into a cultural history, and the structure and contents of Newton's Point (BeDq11--) nd the Baird site (BdDq-3) are compared to those of sites excavated elsewhere. The integration of these results into a regional framework leads to a discussion of interpretations about regional exchange networks, and the nature of the participation in it by Grand Manan's Native people.

Chapter 2
SOURCES AND RESOURCES

In the regional reconstructions of prehistory that have been developed in the Maine/Maritimes area, archaeologists have viewed the Grand Manan archipelago (GMA) as peripheral to cultural activity; these activities are depicted as being concentrated in resource-rich estuarine systems. Implicit in this perception is the idea that the GMA was resource poor, or contained insufficient resources to support any sizable or long-term settlement. This notion has been reinforced by a lack of recorded archaeological sites, which is, in part, a result of little sustained research effort. In this chapter, I will explore the potential of the GMA in terms of resources that would have attracted prehistoric foragers and resources that would have supported settlement by providing basic needs. The discussion of resources is subdivided into a discussion of recent and modern distributions of inorganic (geological) and organic (biogeographical) resources, and a discussion of temporal changes in the environments of the GMA that may have impacted on these resources and their availability over time. The second part of the chapter examines other sources of information that have supported interpretations about GMA prehistory: the existing accounts of previous archaeological exploration and the Native settlement and use of the GMA.

THE MODERN CONTEXT

The GMA consists of a large main island (Grand Manan), and a cluster of 20 smaller islands and islets on a submerged shelf or plateau, extending to the south and east (Figure 1.2). With a surface area of ca. 140km^2, the main island is by far the largest offshore island in the Gulf of Maine. The smaller islands of the GMA comprise an additional 15km^2. The closest mainland landfall is West Quoddy Head (WQH), Maine, which lies 11km to the west of the GMA, on the opposite side of the Grand Manan Channel. WQH is on the northern edge of a segment of the coast of the State of Maine known as the 'Bold Coast'. To the north of the GMA is the Quoddy region (QR), and the southwest coast of New Brunswick. The QR is essentially a large estuarine system for the St. Croix and Magaguadavic rivers. Although the coast of mainland New Brunswick is over 25km away from the northern tip of Grand Manan Island (GMI), the QR contains many small- to medium-sized islands, the closest of which, Campobello Island, is immediately north of WQH. To the east and south of the GMA are the open waters of the Bay of Fundy and the Gulf of Maine. The isolation of the GMA from the mainland is exacerbated by the cold water temperatures of the Bay of Fundy, and the depth of water

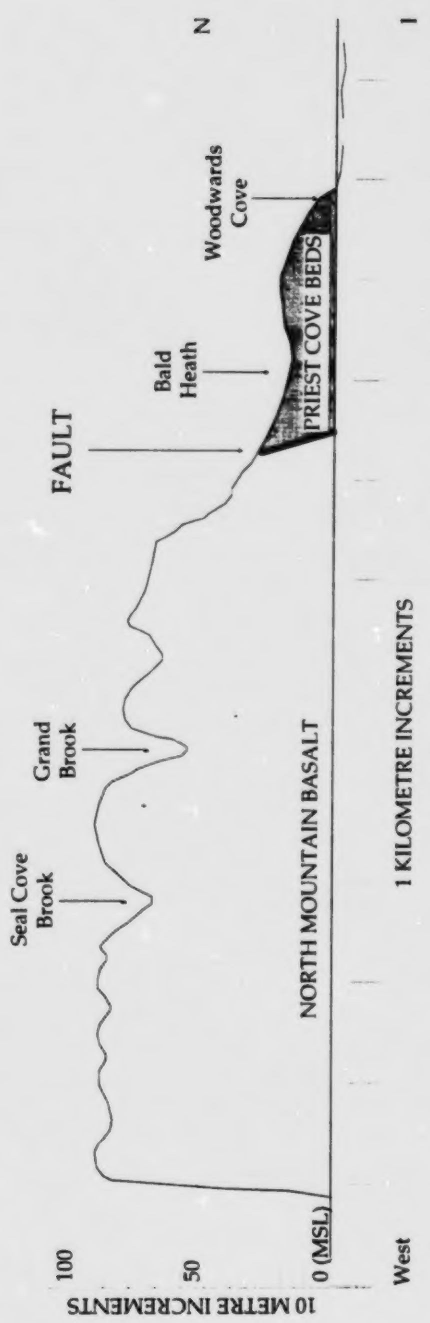


***Figure* 2.1:** *An idealized cross-section of Grand Manan Island, extending west to east taken from just south of Little Dark Harbour to Woodwards Cove.*

and powerful currents of the Grand Manan Channel.

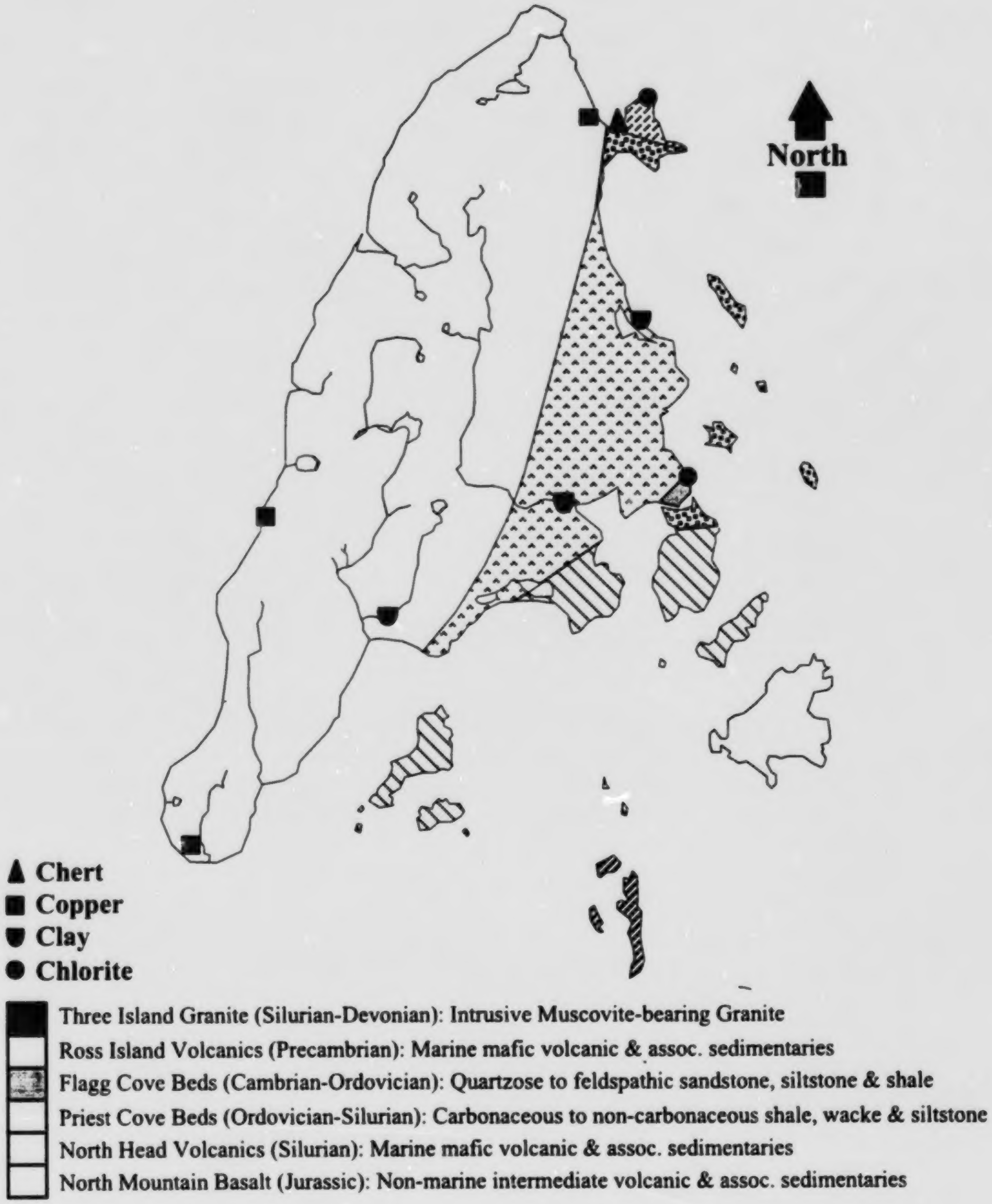
The main island of Grand Manan is roughly wedge-shaped in cross-section (Figure 2.1). The northern and western edges of the island rise precipitously from the ocean, with abrupt cliffs of columnar basalt that reach 90 to 200m in height. Where there are narrow beaches along this shore, they are overhung with cliffs; these beaches are composed of huge angular chunks of the basalt, shattered rocks, and in some places large water-ground cobbles, making them inhospitable in character. There are only a few spots along the northern and western shore where a boat can be used to gain access to the interior. The uplands of GMI, which run alongside the steep western coast, are broad, pocked with ponds and heaths, and incised by small stream valleys. From these rugged uplands, the relief falls rapidly towards the eastern side of the island.

In contrast, the eastern, and much of the southern coasts are composed of low hills, beaches of cobbles, pin-gravel or sand, low bedrock outcrops, and extensive intertidal mud flats. Along these shores are scattered numerous small islands, islets and ledges (MacKay *et al.* 1979: 9). There are many natural harbours, and not surprisingly, almost all of the modern settlement occurs clustered in these more accessible coves and beaches.

GEOLOGY

An explanation for GMI's topography lies with the geological structure and genesis of the GMA (Figure 2.2). A major fault extends from Whale Cove, at the northern end of the main island, to Red Point, ca. two-thirds of the way down the eastern side of GMI (MacKay *et al.* 1979: 10; McLeod, Johnson and Ruitenberg 1994). On the western side of this

Figure 2.2: Inorganic resources of the Grand Manan archipelago (derived in part from McLeod, Johnson and Ruitenberg 1995, "Geological Map of Southwestern New Brunswick, Map NR-5")


North
▲ Chert
■ Copper
Clay
● Chlorite
Three Island Granite (Silurian-Devonian): Intrusive Muscovite-bearing Granite
Ross Island Volcanics (Precambrian): Marine mafic volcanic & assoc. sedimentaries
Flagg Cove Beds (Cambrian-Ordovician): Quartzose to feldspathic sandstone, siltstone & shale
Priest Cove Beds (Ordovician-Silurian): Carbonaceous to non-carbonaceous shale, wacke & siltstone
North Head Volcanics (Silurian): Marine mafic volcanic & assoc. sedimentaries
North Mountain Basalt (Jurassic): Non-marine intermediate volcanic & assoc. sedimentaries

fault rises columnar basalt, formed in the Jurassic period. This formation has a steep and angular character (Figure 2.1). On the eastern side, are older (Precambrian) rocks; the grinding weight of time is manifested in the smoother, rolling coastline. These rocks are more heterogeneous than those to the west of the fault. They are composed of shale, greywacke, siltstone, quartzose to feldspathic and micaceous sandstone, quartzite, minor limestones, mafic volcanics and associated sedimentary rocks, granites and felsic porphyry (see below, and McLeod, Johnson and Ruitenberg 1994).

The Jurassic basalts of GMI are a part of the Fundy group, which includes the Fundy Group basalts that outcrop near the Minas Basin, at the head of the Bay of Fundy (Alcock 1948; Doyle 1995: 308), and along the northern shore of southern Nova Scotia (Keppie and Muecke 1979). The Nova Scotia basalts, which have been dated to the Triassic/Jurassic periods, appear to be slightly older than those in the GMA, which (with a date of 191 ± 2 Ma U-Pb) are placed firmly in the Jurassic period (McLeod, Johnson and Ruitenberg 1994; see Figure 2.3). The area around Minas Basin of Nova Scotia contains archaeologically significant outcrops of 'high-quality' (tool-stone quality) cherts and agates, which were sought after by prehistoric foragers for the purpose of tool manufacture and exchange with neighbouring Native groups (Bourque and Cox 1981; Doyle 1995: 306; Sanger 1991; also see below). These cherts are thought to be siliceous exhalates in the Triassic-Jurassic basalts (Doyle 1995: 306), and recent examinations of thin-sections of modern samples have confirmed a volcanic host rock (Wilson 1996).

Despite the genetic relatedness of the GMA and Minas Basin basalts, there has been some debate as to whether or not similar cherts can be found in the GMA. Early historic accounts (e.g., Gesner 1981: 15) suggested that "amethyst, agate, jasper, hornstone" and other minerals could be obtained from the trap rock (basalt) at Northern Head and Dark Harbour (Figures 2.2 and 2.8). The presence of chalcedony, crystal quartz and amethyst at these locales was corroborated by the Geological Survey of Canada (Sabina 1964: 11). Furthermore, samples of agate and jasper reported to be from Whale Cove in North Head are on display in the Grand Manan Museum. Unfortunately, these specimens have been polished and sealed behind glass, making further assessments of their nature difficult.

Recently, archaeologists and geologists (Doyle 1995: 308) have attempted to resolve this issue by re-examining beaches and accessible rock for samples. Doyle (1995), accompanied by archaeologists from the Maine State Museum, recovered some chert from Southwest Head. However, he concluded that "... only a few fracture-filling patches of dull white chalcedony have been observed. It was of poor quality and size for artifacts..." (Doyle 1995: 308). With a longer search time, and a larger team of searchers, I continued this exploration during the GMAP II, covering 71km (cumulative) of coastline in the GMA (for details see chapter 3, table 3.1). These efforts resulted in the recovery from Whale Cove (Plate 2.1, Figure 2.8) of several pebbles and small cobbles of high-grade chert (Plate 5.1). This chert is either mottled red, or blue-white.

Macroscopically, the specimens recovered are somewhat different from the "classic" Minas Basin chert that is usually encountered in archaeological collections, in that it is less variegated, and does not exhibit common colour variants such as the "mustard-yellow" chert. However, microscopic examination of thin-sections reveals that they are remarkably similar to the Minas Basin cherts, both in structure and genesis (Wilson 1996). The macroscopic variation between the Whale Cove and Minas Basin cherts may be an expression of the natural range within cherts associated with the Fundy Group basalts, as this range is great, and not fully appreciated through an examination of archaeological collections. The implications of this discovery for the sourcing of lithic materials will be discussed in Chapter 5.

Copper, another archaeologically significant material, is also associated with the Fundy Group basalts. Occurrences of subaerial, volcanic-hosted, stratabound copper, uranium, and lead have been recorded in several parts of the GMI Jurassic basalt (McLeod, Johnson and Ruitenberg 1994), and native copper can be collected from Whale Cove (Black 1984: 8; Legget 1981:46; MacKay *et al.* 1979:11; Sabina 1964: 11), and Southwest Head (W. Dathan 1995: pers. comm.). Historic accounts suggest the quantity and quality of copper available from some of these sources:

> *Lumps of copper ore, one weighing several pounds, in its native purity, have been picked up at different places from time to time, in the vicinity of Eel Brook, Fish Head and around the shores of Whale Cove... in 1862, Moses Bagley made a new discovery of copper at the western or back part of the island near Sloop Cove (Lorimer 1876: 68).*

Some of these sources were significant enough to have been commercially mined, beginning in 1870 (Lorimer 1876).

The eastern side of the Whale Cove-Red

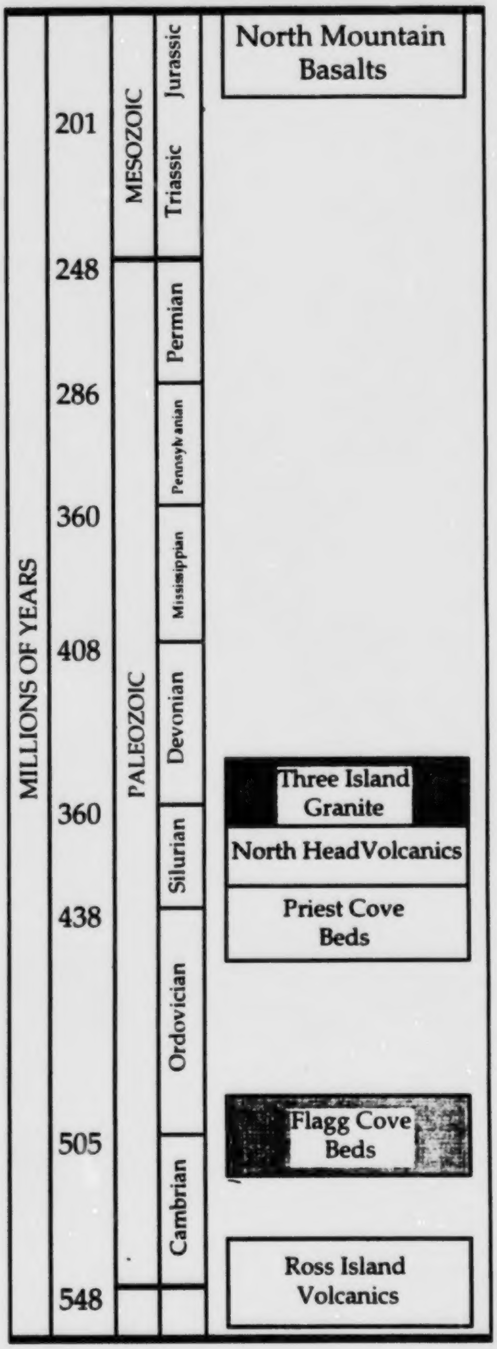

MILLIONS OF YEARS
201
248
286
360
408
360
438
505
548
MESOZOIC
PALEOZOIC
Jurassic
Triassic
Permian
Pennsylvanian
Mississippian
Devonian
Silurian
Ordovician
Cambrian
North Mountain Basalts
Three Island Granite
North Head Volcanics
Priest Cove Beds
Flagg Cove Beds
Ross Island Volcanics

Figure 2.3: A chronostratigraphic representation of the Grand Manan geological formations, derived from McLeod, Johnson and Ruitenberg (1994).

Point fault is geologically more complex and variable. According to McLeod, Johnson and Ruitenberg (1994), rocks from at least five different geological periods outcrop along these shores (Figures 2.2 and 2.3):

1/ North Head Volcanics: across the northern half of North Head are marine-associated mafic volcanics and associated sedimentary rocks of Silurian age.

2/ Flagg Cove Beds: the southern edge of North Head, as well as Long Island, Great Duck Island, Nantucket Island, and either side of the Ross Island Thoroughfare, consists of neritic sedimentary beds laid down in the Cambrian/Ordovician, which are composed of quartzose to feldspathic sandstone, siltstone and shale, some micaceous shale, quartzite and quartzite-pebble to polymictic conglomerate, and some minor limestone.

3/ Priest Cove Beds: this is a large sedimentary deposit restricted to the main island, extending from immediately south of North Head to Red Point, which contains bathyal carbonaceous to non-carbonaceous shale, wacke and siltstone, deposited in the Ordovician-Silurian period.

4/ Ross Island Volcanics: the southern portion of Ross Island, most of Ingall's Head, as well as Inner and Outer Wood Islands, Cheney Island, and White Head Island are composed of marine-associated mafic volcanics and associated sedimentary rocks of Hadrynian-Cambrian age; a small portion of the western shore of White Head Island, contains some sedimentary deposits of the same age and same group, which consist of minor limestones, and quartzose to feldspathic sandstone, siltstone and shale with some micaceous shale, quartzite and quartzite-pebble to polymictic conglomerate.

5/ Three Island Granite: an intrusive volcanic composed of granite and felsic

***Plate 2.1:** A view of Whale Cove, showing beach segment where Whale Cove cherts were recovered as beach pebbles and cobbles (photo credit: Brent Murphy).*

porphyry, outcropping on the Three Islands and Machias Seal Island, of Silurian-Devonian age.

These outcrops and deposits contain many materials that may have been of interest to prehistoric populations. In 1839, Abraham Gesner, then the New Brunswick provincial geologist, prepared a report based on a detailed exploration of the GMA. In his report he refers to the occurrence of specific rocks and minerals, and in some cases, to the use of these materials by Passamaquoddy peoples.

One of the northernmost points on North Head is Fish Head, where Gesner reported the occurrence of quartz veins, in which he found dark green chlorite in considerable quantities.

> *This mineral is much used by the Indians, who pay an annual visit to the spot, to procure a quantity of the chlorite to make their pipes. Before they were acquainted with iron, it was also used by them for pots and other vessels, therefore the mineral has been called pipestone, potstone, &c. (Gesner 1981: 19).*

Modern geological maps (McLeod, Johnson and Ruitenberg 1994) indicate the presence of quartz and/or quartz-carbonate veins (containing Sb, Cu, Pb, Zn, Fe, Au, Bi, Ba, Mn) in the North Head volcanics. Inspection of this locale, with the assistance of the land owner, Mr. Basil Small, revealed intermittent exposures of what appeared (macroscopically) to be green chlorite, extending from the vertical rock face of Fish Head, southward into North Head.

Gesner (1981: 20-21) reported the presence of crystals of fine limpid quartz embedded in the Ross Island volcanics, on Ross Island (near the house of Mr. Ross), and in the white quartz of White Head, on Whitehead Island (Figure 2.8). He also mentions chert outcrops on Gannet Rock, a small barren rock over 6km due south of the Three Islands. Gesner (1981: 21) suggests that Gannet Rock is composed of "trap rock", a term which he also uses for the Fundy Group Jurassic basalt of western GMI. Unfortunately, Gannet Rock is too small and isolated to appear on geological maps, so that its geological origins and structure are unverified. The presence of these crystal quartzes and cherts were not confirmed during the GMAP II, because their locations prevented detailed exploration.

The widespread distribution of a variety of quartzites is also of archaeological interest, although they are usually mentioned only superficially by geologists (e.g., Alcock 1948; McLeod, Johnson and Ruitenberg 1994). A wide range of colours and textures of quartzite (white, grey, brown, pink, etc...) were noted and/or recovered from every beach on the southeast shore explored on the GMA during the summer of 1995; these were almost always medium to large, round, worn cobbles, which are very durable and could be derived from either primary or secondary geological sources.

The surficial geology of the GMA has been produced by the interaction of more recent geological processes, especially glaciation, with the bedrock. The surface, or soil mantle, is glacial outwash, composed of "...sand and gravel with occasional cobbles and a few boulders; angular rock fragments are frequent" (Legget 1981: 33), with only marginal and localized development of organic soils. Glacially-derived clay-tills occur at several places along the eastern shores of GMI. The most notable of these is at the mouth of Grand Harbour Brook (Figure 2.8), where a brick works was located in the last century to exploit this material (Legget 1981: 33-34). During periods of glaciation the GMA appears to have been connected to the mainland either by bridging ice sheets or through the drastic lowering of sea-levels as a result of the quantity of global water that was tied up in glacial ice. The evidence for this connection includes 'erratic' (glacially imported) boulders derived from mainland sources (Legget 1981: 40). This has implications for both the biogeography and paleoenvironmental analyses and for the interpretation of the sources and distribution of culturally utilized (flaked lithic) materials on archaeological sites. Archaeologically significant materials which may not actually outcrop on the GMA could occur on the beaches as a result of glacial transport.

BIOGEOGRAPHY

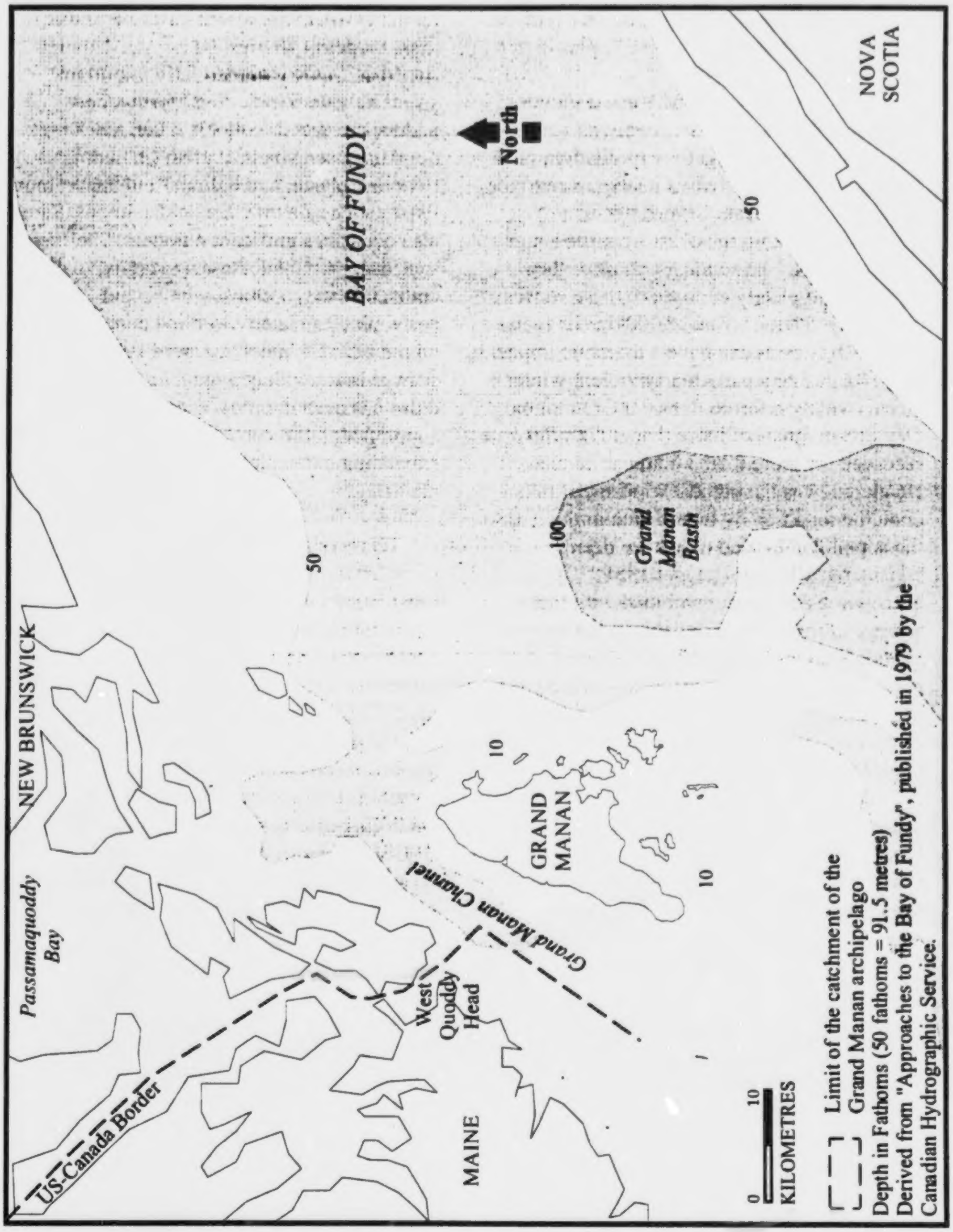
Inorganic or geological resources might have drawn human populations to the GMA. However, unique attractors such as these are only a part of the equation. Resources which could have sustained human inhabitants without necessarily being attractions in and of themselves must also be considered. The relatively large size of the GMA and its isolation in the Bay of Fundy combine to create a rich and diverse environment. Although the prehistoric foraging populations of the GMA may have relied on mainland resources to varying extents, it is possible to consider the GMA itself as a single catchment. The organic or biological resources of this catchment area are of two kinds: terrestrial/freshwater-based, and marine-based. To encompass these resources, the limit of this catchment is defined as the edge of the flat upper surface of the shelf that rises from the ocean floor, upon which the GMA rests (Figure 2.4).

Marine resources

As an archipelago, the ecology of the GMA is strongly influenced by the ocean. Because of the configuration of modern settlement and road systems visitors are almost always in sight of the ocean. For modern residents the ocean is a focus of life and a source of food, work and play. This omnipresence is reflected in the biogeographic literature on the GMA, as there are many studies into the GMA's marine system and resources (for an excellent overview of the physical environment of its marine system and modern marine resources, see McKay *et al.* 1979).

The marine system around the GMA is characterized by a macro-tidal regime with tidal ranges of up to 8m. These tides produce an energetic water system, marked by strong tidal currents, that are constantly shifting in direction and strength (Trites and Garrett 1983: 9). The currents within the GMA can reach over six knots in speed (MacKay *et al.* 1979: 22). Tidal mixing enhances the productivity of the waters by increasing the nutrients available to marine creatures. Indeed, the position of the GMA in the mouth of the Bay of Fundy would have afforded foraging populations access to a very rich marine ecosystem with an abundance of marine plants and animal life (Black 1992: 5; MacKay *et al.* 1979; Thomas 1983). Variations in intertidal and subtidal substrates may also influence the diversity of marine life in the waters of the GMA. Although rocky shores with subtidal ledges and cobble and boulder-strewn substrates predominate, sandy and muddy bottoms are also present (MacKay *et al.* 1979: 17). In some areas, particularly along the eastern coast, and around Grand Harbour, there are extensive intertidal mudflats containing clam beds (Figure 2.8). Water temperatures in the Bay of Fundy are typically cold. Highs of ca. 15°C have been recorded in

Figure 2.4: The bathymetry at the mouth of the Bay of Fundy, and the relationship of the Grand Manan Archipelago to points within the Bay (following page).


BAY OF FUNDY
North
NOVA SCOTIA
50
50
50
100
Grand Manan Basin
NEW BRUNSWICK
Passamaquoddy Bay
10
10
GRAND MANAN
Grand Manan Channel
West Quoddy Head
US-Canada Border
MAINE
0
10
KILOMETRES

Limit of the catchment of the Grand Manan archipelago

Depth in Fathoms (50 fathoms = 91.5 metres)

Derived from "Approaches to the Bay of Fundy", published in 1979 by the Canadian Hydrographic Service.

the waters around the GMA, but the average summer temperature is ca. 10°C (MacKay *et al.* 1979: 17, 21).

The position of the GMA in the mouth of the Bay of Fundy affects not only its accessibility to humans for exploitation, but also dramatically increases its exposure to the vagaries of the ocean. Severe storms frequently track up the coast from the south and southeast. The southeast coast of the GMA is completely exposed to these storms, and with a fetch of over 15,000km (Legget 1981: 30), storms can have a dramatic impact. In 1976, during a particularly violent winter storm (widely referred to as the Groundhog Day Storm) gusts of more than 209km/hr were recorded for more than 3 hours at Ingalls Head; this was the highest wind speed that could be recorded by that particular device, so the actual wind speed may have been considerably higher (Legget 1981: 30). Storms such as these, combined with fast water currents, tidal fluctuations, numerous subtidal and intertidal ledges, and long periods of dense summer fog would have been important considerations for sea-going foragers attempting to navigate in and around the GMA.

Historically, the primary focus of settlement on the GMA, both for Passamaquoddys and for Euro-Canadian settlers, has been the fisheries. The GMA is renowned as a spot for watching large whales, such as the finback, minke, humpback, and right whales, as well as porpoises and dolphins. Northern Head, Swallowtail Head and Dark Harbour afford excellent lookouts where whales and porpoises can be spotted easily in late summer and fall (Gaskin 1983: 265; see Figure 2.8). The GMA has a healthy population of harbour seals, and is one of a few places in the Bay of Fundy that has a modern population of grey seals. Although marine mammals were extensively exploited on the GMA in the recent past, the basis of most modern fisheries are bony fish and shellfish. Many commercially important species abound, including herring, cod, haddock, tomcod, pollock, hake, mackerel, dogfish, skate, smelt, flatfish (including flounder, plaice, and halibut) and anadromous fish (such as alewife, eel, and salmon). Squid also occur in significant numbers. Shellfish, such as soft-shelled clams, mussels, scallops, crabs, lobsters, urchins, whelks and periwinkles are also exploited commercially on the GMA. Finally, assorted kelps and seaweeds are widely available; traditionally, dulse has been the most economically significant, but recently new markets are expanding the exploitation of other marine plants.

Terrestrial resources

GMI, with a surface area of 140km^2, has a substantial interior. The ocean is, however, the overriding climatic and vegetational variable, which manifests itself in cool springs, moist summers, and moderate winters (MacKay *et al.* 1979: 13-15). As Hinds (1983: 269) points out, the direct impact of the ocean on coastal terrestrial ecology and the environment decreases exponentially with distance. The modifying effects of the ocean combined with GMI's size result in a mosaic of habitats that vary from the coastal margin inward. This terrestrial variability is expressed as a diversity of habitats and species, which would have been of great benefit to foraging populations.

These diverse habitats are also modified by the geography of the main island. In general, the island consists of uplands, running along the west coast, and the eastern lowlands. The upland system contains coniferous forests broken by 'heaths', bogs, swamps, ponds, and small brooks. In general, the term 'heaths' refers to poorly drained, treeless areas. In some cases, such as at Southern Head, the deflection from forest cover results less from bog-like soil and ground conditions, and more from constant exposure to wind and storms. Trees on heaths such as these are stunted and twisted, with growth restricted to their leeward sides. In other cases, the term 'heath' actually refers to true sphagnum bogs (MacKay *et al.* 1979: 12). The uplands are dotted with places where freshwater collects into bodies large enough to be considered small lakes or ponds, with 16 such ponds distinguishable on the 1:50,000 topographic map. Most of these ponds are simply large open patches of reddish-brown 'bog-water' surrounded by typical bog vegetation, but some, such as Miller Pond, are clear, sand- or gravel-bottomed lakes (MacKay *et al.* 1979: 12).

The cool, moist summer climate suppresses fire conditions considerably. Nonetheless, the GMA experiences periodic forest-fire events. As a result, the degree to which modern habitats and forest cover reflects that of the distant past is not clear. The rareness of these fire events allows a build-up of standing dead wood. As a result, when they occur, fires are dramatic, as demonstrated by the fire of 1880. In this case, a small fire broke out near Southern Head, but high winds fanned it northward. It was finally contained at the Whistle Road, which runs less than 1km from the northeast side of Northern Head. The burned area, 22.5km long by 9km wide, encompassed almost the entire island (Allaby 1983).

Most of these habitats and water resources would be relatively inaccessible but for the stream valleys that crisscross the spine of GMI. The two largest valley systems, the Grand Brook valley and Seal Cove Brook valley drain considerable portions of the uplands. These brooks both flow to the southeast, ultimately ending at Grand Harbour and Seal Cove respectively (Figure 2.8). The main branch of Grand Brook is more than 13km long, and is joined by 6 smaller tributaries. The combined length of the streams feeding into the Grand Valley is 23km. Seal Cove Brook is more than 12km long, and is fed by 16 smaller tributaries. These combine to make a total stream length of 35km. There are several places along these valleys where natural meadows, or "blueberry prairies" occur (Legget 1981: 40). Most of the drainage of the uplands flows to the east (11 streams more than 1km in length, and at least 10 less than 1km long), in contrast with the largely sheer west face of the island (4 streams more than 1km long and 6 less than 1km long).

The eastern lowlands are much more accessible and varied. Forest cover is mixed hardwood/softwood. Low-lying areas near Grand Harbour and Woodward's Cove contain sphagnum bogs (Figure 2.8). An extensive saltwater marsh, renowned amongst naturalists for its seasonal populations of migratory shorebirds and waterfowl, occurs at Castalia, and several of the many small coves, such as Whale Cove, near North Head, have cobble beaches which shelter large brackish ponds.

The resources with prehistoric economic potential in these habitats include a wide range of potentially useful plants—food stuffs, material for basketry and textiles, pharmacological substances and so on (Dathan 1995, and W. Dathan 1995: pers. comm.). Freshwater and anadromous fish occur in many of the brooks and streams. Local informants report good trout fishing in Deep Cove and Seal Cove Brooks. Eel Lake and Eel Brook are apparently aptly named (local informants and Gesner 1981: 18; see Figure 2.8). The quantity of moving fresh water is also conducive to populations of beaver and muskrat. Traces of these creatures are evident in many places in the GMA. Bird life of all kinds is abundant. Indeed, the GMA has an international reputation as a place where migratory birds, including waterfowl, wading birds, and a variety of passerines, as well as pelagic species can be seen in large numbers.

However, despite its relatively well-developed interior, in the past the GMA appears not to have supported any of the larger terrestrial mammals that figure so importantly in the diets of mainland foragers (e.g., white-tailed deer, moose, or bear; Black 1992: 239). Modern populations of white-tailed deer are the result of recent introduction by Eurocanadian settlers. The absence of large terrestrial mammals could have had one of two possible impacts on prehistoric settlement on the GMA: either (i) the protein and calories available in the catchment of the GMA were insufficient to support permanent, year-round settlement, or (ii) marine resources would have provided enough protein and calories in the absence of large terrestrial animals, allowing permanent, year-round settlement. The dichotomy oversimplifies the issue of subsistence and settlement; variables such as population size, the nature of seasonal movement of peoples, and patterns of regional interaction are also important considerations. However, no resolution of this issue is possible based on the material recovered during the GMAP II.

Although the ocean would have been a significant consideration for ocean-going foragers, it was not necessarily a barrier, depending upon seasonal weather patterns. Throughout the early historic period Passamaquoddys from Pleasant Point, Maine, crossed the Grand Manan Channel seasonally to settle on the smaller islands and the west coast of the GMA (see below). These crossings were accomplished in birch bark canoes, a method of travel which has its antecedents long before the historic period (Sanger 1988: 91). Although the skills and knowledge necessary to make such trips must not be underemphasized, they demonstrate that regular visits to the GMA would have been feasible in the distant past.

Paleoenvironments

The discussion of the availability of resources has been thus far largely limited to an assessment of their recent distributions and the modern environment that sustains them. However, environments are constantly subjected to forces and processes of change. The reconstruction of past environments is limited by the kinds of information that are carried into the present. Only a few aspects of past environments are actually accessible to modern evaluation (Dincauze 1987: 256). Furthermore, the study of paleoenvironments requires the integration of information from widely disparate disciplines, which can easily lead to a superficial treatment of complex issues and a misuse of data (Dincauze 1981, 1987; Kellogg 1988). These problems are compounded in the GMA by the lack of paleoenvironmental studies or data that pertain specifically to the archipelago itself. There have been numerous palynological studies in adjacent regions, and these allow a partial understanding of widespread, macro-regional vegetation changes and inferred environmental shifts (Bradstreet and Davis 1975; Gaudreau 1988; Mott 1975). Paleoenvironmental information is also available in geomorphological data which may allow for reconstructions of events, such as the recession of glaciers (Joyce 1988; Nicholas 1988) and processes, such as sea-level rise (Grant 1975; Kellogg 1988). It is also possible that the GMA represents a distinctive portion of the Bay of Fundy, and that its physical separation from the mainland and its unique geology and geography have influenced the finer details of paleoenvironments in such a way as to make them noncomparable to mainland conditions.

With these shortcomings in mind, a general discussion of the paleoenvironments of the GMA will follow based on two lines of inference: (i) sea-level rise and local geomorphology, and (ii) changes in vegetation and climate. The first issue can be addressed using local information, fleshed out with regional data, while the second issue must be largely addressed from a regional, mainland perspective.

Sea-level rise

In the Gulf of Maine the Holocene period has been characterized by long-term changes in sea-level resulting from the effects of glaciation. In the Maritime Provinces of Canada, rising sea-levels impact on coastal archaeology in a number of ways. Erosion is one of the most widespread and unrelenting agents of destruction of coastal archaeological sites. A close examination of sea-level rise is useful for charting future incursions, but also facilitates plotting the past regression of land. This in turn, can assist with an assessment of past geomorphology and potential archaeological site locations. Sea-levels also have a dramatic effect on local environmental conditions of all kinds, from the development of tidal regimes to local distributions of animal life and vegetation.

On a fine temporal scale sea-level rise proceeds erratically. Periods of relative stability, when hard substrates such as bedrock outcrops protect landward surfaces, are punctuated by rapid erosion through soft substrates as the hard substrates are broached. Other local factors, such as beach gradients, exposure, and current velocities are significant variables in the interaction between rising sea-levels and erosion. On a larger temporal and geographic scale, archaeologists generally perceive sea-level rise as proceeding at a steady and predictable rate (Grant 1970). The most common way that sea-levels are plotted is through the construction of sea-level curves, where dated sea-levels are plotted and examined in relation to a regression line (Figure 2.5; Kellogg 1988: 88). However, some researchers (Sanger 1984, 1985; Black 1992: 6) have suggested that there have been periodic changes in the rate of rise, with several periods of rapid rise punctuated by longer periods of relatively stable sea-levels. Moreover, Kellogg (1988: 93) emphasizes the importance of plotting local relative sea-level curves for any reconstruction and highlights the problems with generalizing eustatic sea-level data over broad regions.

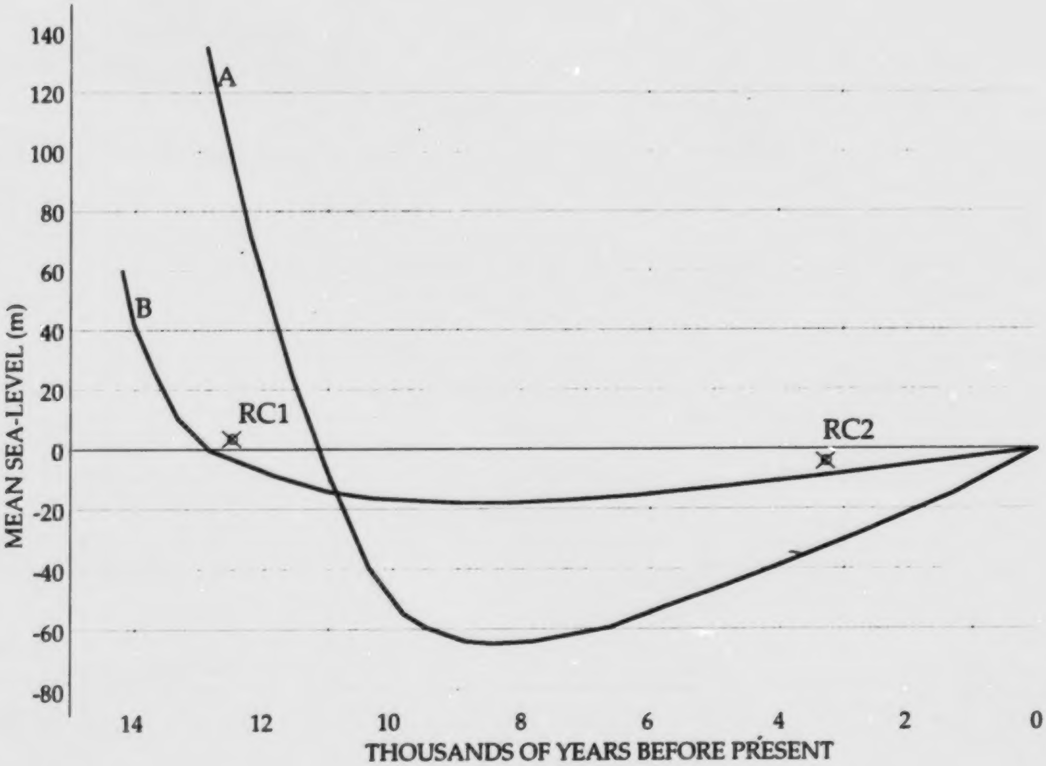
The pattern of sea-level rise that has been modelled for the Gulf of Maine, generalized to a degree that transcends most of the debate about its specific nature and progress, is characterized by initial high water levels, with rapid recession to below modern levels, followed by a gradual return to modern levels. Two such patterns are plotted and contrasted in Figure 2.5, one by Legget (1981) drawn from Grant (1975), and the other from Kellogg (1988). The patterns vary only in intensity. The mechanisms behind sea-level change and the overall pattern of this change are more generally agreed upon.

The initial dramatic shift in sea-level corresponds to the glacial and early post-glacial period. Legget (1981: 30) gives ample evidence of the glaciation of the GMA in the form of widespread glacial till, erratics and abrasions or striae. The initial recession of glacial ice caused marine water to flood exposed land, which was still depressed under the weight of glaciation. At this time (variously, between ca. 14,500 and ca. 12,000 years ago) the sea-level may have been as much as 135m above its present level (Kellogg

1988: 90). However, the relatively rapid removal of ice resulted in a rebounding of the surface of the land (isostatic rebound), causing sea-levels to recede until between ca. 8000 and ca. 9000 years ago, when they stood between 65 and 20m below modern levels. From this point forward, rise is gradual and consistent at a large scale, and may or may not have included relatively short periods of levelling (Sanger 1985).

There is considerable debate over when the Bay of Fundy began to develop its significant tidal amplitudes. In the early Holocene the Gulf of Maine would have been to a large extent cut off from the North Atlantic tidal system. Some earlier studies had placed the onset of tides at the time when the outer banks became submerged, between ca. 6000 BP and ca. 4000 BP (Grant 1970). Recent studies have suggested that most of this increase in tidal amplitude occurred earlier (Kellogg 1988: 91). Changes in tidal

Figure 2.5: Relative changes of sea level in the Maine-Maritimes area, as plotted by A: Kellogg (1988: 90), and B: Legget (1981: 42, after Grant 1975). The radiocarbon assays from Grand Manan are indicated by (☒). RC1 was run on marine shells (Macoma calcarea) recovered from 4 m above HWOST, and RC2 was run on tamarack (Larix laricina) recovered from 4 m below HWOST (Legget 1981: 43).



amplitude were a significant variable for prehistoric populations. Increased tidal amplitudes create a broad and very rich intertidal zone (McCormick 1980: 29). The submergence of the outer banks would have increased circulation of the waters of the Gulf of Maine and caused a general cooling of the Gulf of Maine through the influx of offshore waters (Bradstreet and Davis 1975:18).

Fortunately, the GMA has yielded some data which is useful for plotting a local sea-level curve. These data consist of fossil shell beds and relict forest and peat layers from several places in the GMA. Fossil shell beds can be found in Grand Harbour, Deep Cove Brook and Red Point Beach (Figure 2.8). These beds contain a variety of cold-water shellfish species, usually recovered several metres above the high water line. In 1978, marine shell (*Macoma calcarea*) was collected from an exposure of sand at Red Point Beach 4m above the high water line (spring tide) and was radiocarbon dated to 13,000 ± 330 years ago (GSC-2777; Legget 1981: 42). Evidence of relict forests occur on Whitehead Island, at Castalia Marsh, and on Kent Island (Figure 2.8) in the form of thick beds of peat eroding into the intertidal zone, frequently containing the stumps of trees. In 1977, a portion of tamarack (*Larix laricina*) was retrieved from a stump in a peat layer on Long Point Beach, Whitehead Island. This layer was 4m below high water (spring tide) and the wood returned a radiocarbon date of 3300 ± 300 years ago (GSC-2718; Legget 1981: 42). These two dates have been plotted in Figure 2.5.

***Table 2.1:** Approximate relative sea levels over the last five millennia, extrapolated from a known level of 4m lower, 3300 years ago.*

Years before present	Shoreline (m below present HWOST)
5000	6m
3300	**4m**
2475	3m
1650	2m
825	1m
0	0m

The more recent date is particularly useful in terms of the archaeological sites of the GMA. Almost all of the typologically dated artifacts and archaeological sites with radiocarbon dated materials in the GMA are within the period of the last 5000 years. If sea-level was at least 4m lower ca. 3300 years ago, and assuming a steady rate of incursion, the average sea-level rise per century is ca. 12cm. This calculation enables a very general reconstruction of local sea-levels at points in time from 5000 years ago to present (see Table 2.1).

By drawing a shoreline 6m below modern levels (the probable sea-level 5000 years ago), it becomes apparent that these levels would have drastically affected the shape and nature of the shorelines of the GMA (Figure 2.6, 2.7). This reconstruction is straightforward, and if anything overly conservative, as it does not take into account the durability of substrates and local erosional factors, which may have allowed for even greater land availability. Given these limitations, however, a sea-level regression diagram suggests how changes in sea-level might affect the location of archaeological sites and local resource availability (Figures 2.6 and 2.7).

Vegetation and climate

Although to date there have been no palynological or paleobotanical studies specifically of the GMA, there have been many long-term studies and analyses of adjacent Maine and mainland New Brunswick. These have permitted the development of a general history of climatic and vegetational change in the Maritime Peninsula during the Holocene.

Most palynological studies in the Northeast have focused on common and palynologically visible genera such as oak (*Quercus*), spruce (*Picea*), pine (*Pinus*), and hemlock (*Tsuga*) to interpret paleoenvironmental change. These genera are linked to forest types (deciduous, boreal, mixed), which have distributions that are correlated to climate and environmental conditions (Gaudreau 1988: 223). Generally, changes in pollen frequencies are interpreted as a series of advances and retreats of individual species and through them, forest types. Unfortunately, these changes are most visible over long time periods, but become problematic when small time increments (less than 1000 years) are considered.

The early Holocene vegetation is marked by a series of shifts in dominant species and genera attributed to changes in climate and land availability caused by the recession of the glaciers. The early shifts include a early mesic (warm, wet) period, between 8200 to 6500 BP (Joyce 1988: 187), followed by a xeric (warm, dry) period, between 6500 and 3200 BP. There is considerable debate about the exact dating of the shifts; some estimates range 2000 years one way or the other for these events (Joyce 1988: 189). The long warm period is followed by a cool, moist period, at ca. 2000 BP (Bradstreet and Davis 1975; Mott 1975). This trend manifests itself as an increase in spruce (*Picea*) pollen and non-

***Figure 2.6:** The present configuration of Grand Harbour and its environs, showing the distribution of archaeological sites and find spots. (BeDq11 is Newton's Point; BeDq12 is Indian Camp Point; BdDq3 is the Baird site).*

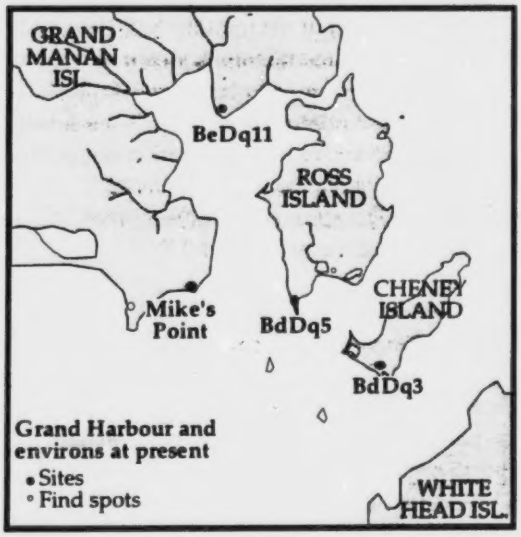
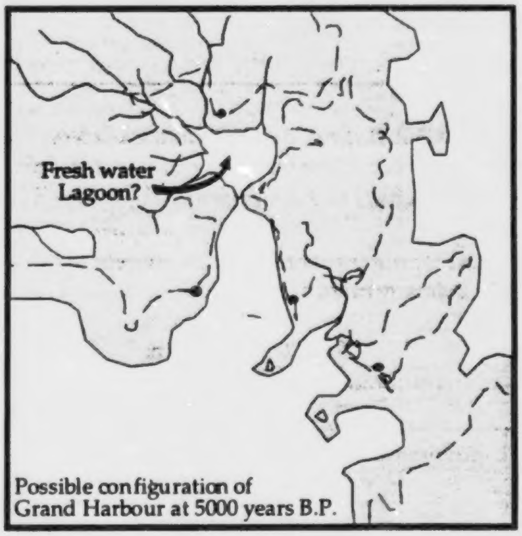

GRAND MANAN ISL
BeDq11
ROSS ISLAND
CHENEY ISLAND
Mike's Point
BdDq5
BdDq3
Grand Harbour and environs at present
● Sites
◦ Find spots
WHITE HEAD ISL.

***Figure 2.7:** A reconstruction of the configuration of Grand Harbour and its environs, ca. 5000 years ago, based on an estimated sea-level rise of 12 cm per century.*


Fresh water Lagoon?
Possible configuration of Grand Harbour at 5000 years B.P.

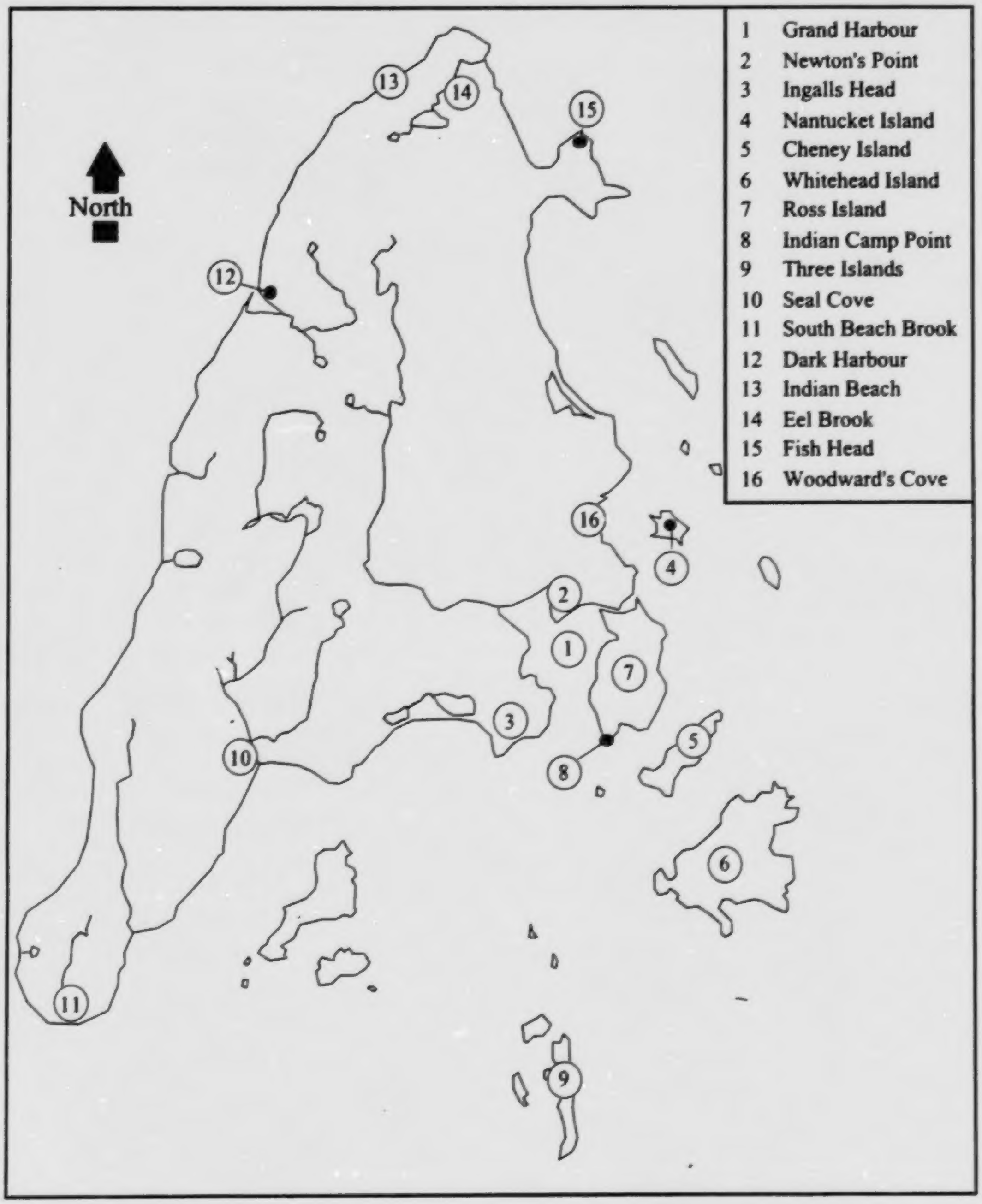
arboreal pollen (NAP), and a decrease in temperate hardwoods and hemlock (*Tsuga*) (Davis *et al.*, 1975:455). Mott (1975: 286) documents a similar change in New Brunswick; "...spruce increased in abundance and became a more prominent member of the forest. Hemlock declined considerably and the hardwoods, though not as abundant, were the prominent trees with white pine, spruce, hemlock and balsam fir on suitable localities". Many researchers refer to this as an environmental deterioration (Bradstreet and Davis 1975:17), owing to the general association of cooler and moister climates with poorer conditions. However, from the perspective of coastal foraging, this may be interpreted as an amelioration, with the concomitant increase in regional diversity and productivity (Bradstreet and Davis 1975:17). This trend appears to have tapered off around 1000 years BP, resulting in the establishment of "the essential elements of the modern forest" (McCormick 1980:30).

PREVIOUS ARCHAEOLOGICAL RESEARCH

The previous section discussed the physical context of the GMAP II. In this section, the discussion will turn to the GMA's historical and cultural context. This context includes a review of previous archaeological research and ethnohistory. Unlike the varied and plentiful literature on the natural history of the GMA, the history of archaeological research in the GMA is encapsulated by only two professional publications. The first is a brief account of fieldwork conducted in 1869 by S. F. Baird (1881), who was then the Assistant Secretary of the Smithsonian Institution. In this report, Baird discusses prehistoric shell-bearing sites at three localities in the GMA: Grand Harbour, Nantucket Island, and Cheney Island (Figure 2.8). His description of these sites provides insights into past site structures and locations that are otherwise unattainable due to the severity of erosion. As a result his discussion of Grand Manan sites is included herein:

> *No. 4. — Grand Menan [sic], New Brunswick; Grand Harbour — Grand Menan is situated about 20 miles from Eastport. This was found to contain many deposits of small shell heaps; no beds, however, were very extensive. Those at Newton's Point and Ingall's Head, in Grand Harbour, were found to be the most production localities. The shells were much broken and mixed with dirt. Where the bed reached the water's edge it was about 40 feet wide and 10 inches thick. The only mammals observed were seals, some beaver, many bones of birds and a few of fishes were obtained. Stone articles were abundant; many arrows, flint flakes &c. A few worked bones of beaver were secured.*
>
> *No. 5 — Grand Menan, Nantucket Island. — This is the residence of Simeon L. Cheney, the well known naturalist of Grand Menan, whose assistance to many American naturalists has been so often gratefully acknowledged.*
>
> *No. 6. — Grand Menan, Cheney Island, near Whitehead Island. — The shells in the last two localities occur on the south side of the island in detached heaps or hummocks, containing each from half a bushel to three or four bushels, not connected by any layers. They are usually high up in the field and covered with thick sod. These heaps show very few bones, and very seldom any stone implements. They appear to have been casual in their origin, and do not mark long continued settlements.*

Figure 2.8: Geographic features and sites mentioned in the text.


1 Grand Harbour
2 Newton's Point
3 Ingalls Head
4 Nantucket Island
5 Cheney Island
6 Whitehead Island
7 Ross Island
8 Indian Camp Point
9 Three Islands
10 Seal Cove
11 South Beach Brook
12 Dark Harbour
13 Indian Beach
14 Eel Brook
15 Fish Head
16 Woodward's Cove
North

> *Cormorant bones were found quite abundantly in the Nantucket Island heaps. There appeared to be an unusual scarcity of bones of fishes in the Grand Menan deposits, and those chiefly of small fishes, such as sculpins, and the like. Bones of codfish, and perhaps even of goose-fish, and other large fish were more common at Eagle Hill, Ipswich [in Massachusetts], where the mounds, while abounding in the bones of fish, furnished very few of mammals and birds (Baird 1881: 294-295).*

There are several points where this report is open to interpretation. Apparently there were at least two shell-bearing sites in Grand Harbour, one at Newton's Point and one at Ingall's Head. It is not clear which of these Baird was describing in the paragraph that follows his heading. Does the description apply specifically to Ingall's Head or is it a general description applicable to both? The opening sentence of the Cheney Island paragraph might imply that there are two sites on Cheney Island, or that the description applies to both the Cheney Island and the Nantucket Island sites. Certainly the interposition of the Cheney Island description between the Nantucket Island title and its description seems to imply this. Subsequent explorations by Black (1984) indicated massive erosion and destruction of most of these deposits, and only the site or sites on Cheney Island were relocated.

Because of the need to clarify these issues and the importance of this record to understanding the GMA's past, the preliminary research for Phase II included a trip in March of 1995 to the Smithsonian Institution Archives, in Washington, DC, and the Smithsonian's collections facility, the Museum Support Centre, in Suitland, Maryland. Some of the archaeological specimens that Baird had collected from the GMA were extant, as were Baird's personal diaries containing entries relevant to his 1869 trip to the GMA (Appendix A).

Baird's diary provided a valuable cross-reference for his 1881 report, as well as a means of evaluating the quantity and quality of his fieldwork. The 1869 expedition consisted of five men, including Simeon Cheney (the "well known naturalist" mentioned by Baird 1881) a marine zoologist, and Baird himself, and lasted from August 18 to August 24, 1869. In his entry of August 19, Baird describes the Cheney Island site, clearly referring to two shell mounds, thus resolving the issue of whether he had meant the second site (and hence the description) to be applied to Nantucket Island. Furthermore, it appears that they spent no more than a few hours on each site. On the only day he reported visiting Newton's Point and Ingall's Head, he also had time to explore some of Whitehead Island. This suggests that Baird did little more than search along the erosional faces of these sites, and, at the most, conduct some spadework in a few spots.

The diary also makes it clear that Baird visited the GMA less than one month before the infamous Saxby gale, a hurricane of historic proportions that devastated the Atlantic coast in September of 1869. Undoubtedly large portions of these sites were damaged and destroyed by this storm. Although Baird visited coastal New England in 1871 and 1872, and may have returned to the GMA for a visit, his journals from these years make no mention of the GMA or its archaeological sites. Unfortunately, if there were any other written records of this expedition they have been lost.

Following Baird's work, there was a long hiatus in archaeological research in this area. It was not until the 1950's and 1960's that any further work was conducted in the GMA. During this period, a rapid succession of researchers became interested in southwestern New Brunswick. The first was T. L. Stoddard of the R. S. Peabody Foundation, who conducted field work and preliminary research in New Brunswick in the mid 1950's. Although he assembled information from ethnohistoric records about the use of GMA by the Passamaquoddy people (Stoddard n.d.) there is no mention in Stoddard's reports of his fieldwork on the GMA. The first evidence of fieldwork was that of R. Pearson in 1962, who conducted excavations in the St. Andrews area on behalf of the Archaeological Survey of Canada (ASC). In his 1968 unpublished report, Pearson contextualizes his St. Andrews work by commenting on a brief survey of the GMA:

> *Finally, there are accounts of Passamaquoddy Indians catching porpoises in historic times on Grand Manan Island. Investigation of sites reported in the 19th century and discussion with local fishermen revealed that the remains of porpoises, which were shot with guns from canoes, were carried away by the high Fundy Tide [sic]. Since there was no refuse in any quantity, and the settlements were only seasonal, few remains were found. One broken flint knife was found in one of the areas. However, at Ingall's Head on Grand Manan, there are excavatable shell heaps (Pearson 1968: 10).*

The broken "flint knife" was apparently recovered from Dark Harbour, on the western side of GMI (Figure 2.8). It is interesting to note that in the 1960s, shell deposits at Ingall's Head were still extant and apparently relatively large. Although Pearson does not confirm this in his report, it seems probable that these shell deposits were the same as those initially reported by Baird. By the late 1960s, Pearson's Passamaquoddy Bay fieldwork had been taken up by David Sanger, also of the ASC. A report made for Sanger by J. S. Erskine (1968), mentions a visit to the GMA, as an aside to the primary fieldwork being conducted around St. Andrews. Erskine makes no mention of Baird's sites, and his survey methodology is unclear in his report. Apparently, no archaeological sites were found in this visit.

This pattern of short-term 'surveys' seems to have characterized all of the early archaeological explorations of the GMA. These methods led almost every researcher to one of two conclusions: (i) that prehistoric settlement on the GMA was either short-term or of little consequence, or (ii) that any archaeological record that might have existed in the GMA had been erased by erosion (Baird 1881; Pearson 1968, Sanger 1991: 55). These conclusions were reinforced by preconceived notions that the GMA was unlike the Quoddy region, or the Central Coast of Maine, two adjacent regions with abundant archaeological sites.

Recently, more methodical research methods have been applied to the GMA, with a concomitant shift in results. This began with GMAP I (Black 1984). With one assistant and twelve days in the field, Black accomplished the following:

-a survey of all public roads by truck, with particular attention paid to gravel quarries and road cuts,
-a survey of the coasts of Cheney, Nantucket and Wood Islands by boat, and
-a foot survey of approximately 75% of the eastern shores and 10% of the western shores of Grand Manan Island (Black 1984: 29).

This resulted in the locating of the site or sites initially recorded by Baird on Cheney Island (see Chapter 3 and 4). This has been the only well documented and methodological survey to date.

Since 1983, there have been several visits by archaeologists to the GMA. In most cases, these have not involved formal surveys. Interest in lithic sources and trade patterns has triggered a search for 'chert' sources (see above), and such prospecting has brought several archaeologists to the GMA. In 1987, Bruce Bourque and Robert Doyle from the Maine State Museum visited the islands looking for chert. They reported finding a small lithic scatter at the mouth of South Beach Brook (B. Bourque 1988: pers. comm. to D. Black). No testing was done and no artifacts collected during their reconnaissance.

Since developing a research interest in the GMA in 1992, I have visited the islands three times to surface collect and beach-walk. Although no new sites or artifacts were discovered in this process, this informal survey developed into the more formal fieldwork of 1995 that is the basis for this present work.

ETHNOHISTORY

While there is little archaeological literature about the GMA, the ethnohistoric literature is more robust, particularly for the period from the early 19th century to the early 20th century. This literature documents the settlement and use of the GMA by the Passamaquoddy people. The traditional territory of the Passamaquoddys encompasses all of the southwestern corner of New Brunswick including the GMA, and part of eastern Maine. The Passamaquoddys are a Native group whose language is closely related to that of the Maliseet, the Native people of the Saint John River valley. Both of these languages belong to the Algonkian language group. In the historic period (the past 350 years), these people were mobile foragers who focused part of their economy on the hunting of sea mammals (Erickson 1978). Historical documents from the 19th and early 20th century indicate that the GMA was being settled seasonally by Passamaquoddys from Pleasant Point in Maine. These people carried out a number of activities, including seal and porpoise hunting (Ganong 1899: 244; Lorimer 1876: 111-112; Perley 1852: 103), making and selling ash-splint and reed baskets (Ganong 1983: 12), and quarrying pipestone (Gesner 1981: 19). Many local inhabitants have strong associations between certain geographical features and their use by Native people (W. Dathan 1995: pers. comm.).

A number of specific locations for Native activity in the GMA are repeatedly referred to by local historians and historical documents. The most frequently mentioned place is Indian Camp Point on Ross Island (Figure 2.8). Gesner (1981) refers to Indians making and selling ash-splint baskets here. It is also the first place local people think of when potential archaeological site locations are discussed. The association is reinforced by the place-name, and the fact that periodically people find stone tools on the beaches of Ross Island, including a contracting-stemmed projectile point on prominent display in the Grand Manan Museum (see Chapter 4). Indian Beach is also strongly associated in local traditions with seasonal Native use. This beach, located on the west coast, just south of Ashburton Head, was used in the 19th century as a porpoise-hunting station by the Passamaquoddys (Ganong 1899: 224; Lorimer 1876: 111-112; Perley 1852: 103). Dark Harbour, just south of Indian Beach, reportedly had a similar use. Eel Brook, which drains part of Northern Head eastward into the ocean north of Whale Cove, is recorded in the historic literature as a camp site and eeling station (Lorimer 1876: 61). Although Gesner recorded no Native activity there in 1839, he noted that Eel Pond is "abounding in large eels" (Gesner 1981: 18). The Three Island chain, of which Kent Island is largest and outermost (Figure 2.8), is also associated with

Passamaquoddy porpoise hunting. Baird's journal entries during his GMA expedition include the following:

> Monday, August 23: Clear. In small boat with Mr. Cheney to Two Islands [Outer and Inner Wood Islands], landing on the outer one, where found *Uria gylle* and *Thalassidroma leachii* breeding: saw young of both species. Returned by 3 Islands, land on the outer and walking down to Indian Beach where arranged with Indian to prepare skin and skeletons of porpoise, seal. Back via outside of White Head Island. (Baird n.d.; see Appendix A)

Finally, Gesner reported in 1839 (Gesner 1981: 19) that Native people were actively quarrying dark green chlorite (pipestone) from Fish Head, a material which was sought after by Native artisans for the manufacture of ritual tobacco pipes.

Unfortunately, the earlier portion of the historic and protohistoric periods are completely absent from the literature. This factor makes the extension of recent historic patterns of seasonality and behaviour to the more distant the past problematic. Significant cultural discontinuities have been noted between the archaeological record of the later part of the prehistoric period, and the earliest historic accounts (Black 1992: 105). For example, porpoise bones are virtually absent from prehistoric archaeological sites in traditional Passamaquoddy territory. The only recorded specimen is from the Camp site (BdDq4) on the Bliss Isl-ands (Black 1992: 105) and it is possible that it was deposited during historic period activity (Black 1992: 101). Seasonal models of transhumance developed from the direct historical method have also been contradicted by archaeological evidence from sites such as the Weir site (BgDq6) on the Blis-s Islands (Black 1992: 119, 148). These examples demonstrate the widespread disruption of Native cultural practices that occurred between the earliest (and unfortunately, unrecorded) contact with Europeans, and the first consistent recording of these practices. Given these examples of the shortcomings of applying historic documents to the prehistoric past, the above discussion is intended to add depth to the investigation of the GMA's past, without leading to models that constrain interpretations of the archaeological record.

Chapter 3
METHODS AND RESULTS

GOALS AND CONCEPTS

Because so little has been known about the past of the GMA, the basic goal of the GMAP II has been the attainment of a basic but broad set of information about the prehistory of the GMA. Drawing upon a wide range of techniques, including informant interviews, collections analysis, and traditional archaeological methods, such as foot survey and excavation, the GMAP II has resulted in the assembling of a bulk of archaeological data and information. In this chapter, the specific methods will be reviewed, followed by a discussion of the results that were obtained.

Archaeological information about past human activities can reside in existing archaeological sites and their contents, but also in extant written and verbal reports of destroyed sites, and in artifact collections (with or without specific provenience). Traditionally, however, archaeologists have not regarded all archaeological remains as equal in value. Theoretically, "archaeological context", the spatial and temporal relationship that can exist between materials, is considered to be the highest form of raw archaeological data (Schiffer 1972, 1983). Artifacts, bioarchaeological specimens and ecofacts, in and of themselves, do not constitute data, but are given significance within this constellation of relationships (Joukowsky 1980: 153). Archaeological sites with a minimal degree of disturbance or high stratigraphic integrity are considered to be the best medium for transmitting this constellation of relationships and materials to the present. The high value placed on stratigraphic integrity is directly linked to its interpretive value (Joukowsky 1980: 156).

Although the primary goal of the GMAP II is a general data capture, the recognition that primary archaeological information can be ranked for interpretive value is important. The key factor in this ranking scheme is the ability to link a given unit of information (artifact) with a source location (provenience). During the data collection efforts it became apparent that this link manifested itself in degrees. In some cases, private collectors retained artifacts but not information about exact source locations, while in other cases, some source information was retained, but due to erosion or site destruction, was no longer correct. This ranking of data not only facilitated the broad-based collection method, but became quite useful in the analysis and integration of the disparate kinds of information.

While archaeological sites and their contents can be considered sources of primary archaeological data, secondary archaeological information, or information relevant to an assessment of past human activity, but not directly a product of it are also important considerations in this research. This information resides in the spatial or paleoenvironmental context of the site and a particular set of past human activities on that site. Archaeologists have generally considered that sites for settlement are selected by people in terms of the benefits that they afford. Although shelter, drainage or view may all be considerations in site selection, access to resources is a primary and limiting factor (Butzer 1982). In a fundamental way, the obscurity of the GMA's past, resulting from the lack of formal research by archaeologists, stems directly from the question of resources. Instead of directly assessing the resource potential of the GMA, archaeologists have inferred the GMA's potential by analogy. In part then, any serious assessment of the prehistoric archaeology of the GMA must include an evaluation of potential resources.

THE GRAND MANAN ARCHAEOLOGY PROJECT, PHASE II

With the broad aspiration of maximum data collection, the development of a specific methodological approach was directed by three factors:

(i) an excessively large research universe (the GMA has a surface area of over 155 km^2);
(ii) the lack of previous interpretive frameworks or analyses through which patterns of site location could be assessed; and
(iii) financial and human resource restrictions.

During the GMAP II, the research effort was divided into two periods: preliminary data collection, and the formal field season. The focus during the preliminary phase was the examination of archaeological collections, the development of contacts in the community, and foot surveying areas with previously recorded archaeological potential. The preliminary data collection began in the fall of 1992, and included the following efforts:

(i) Grand Manan, November 13-14, 1992 (S. Blair and D. Black): examination of artifacts in the Grand Manan museum and the Small collection; unsuccessful foot survey of Deep Cove Brook and South Brook Beach for reported sites.
(ii) Nantucket Island, August 30-Sept. 3, 1993 (S. Blair and 5 field assistants): unsuccessful foot survey and testing of probable site locations on Nantucket Island (see below).
(iii) Grand Manan, October 1993 (S. Blair, D. Black, one field assistant): unsuccessful survey for a reported site at Castalia.
(iv) Washington, DC, March 1995 (S. Blair, W. Dathan): examination of the Smithsonian's Grand Manan collection, in particular artifacts with their source on the GMA.
(v) Grand Manan, April 1995 (S. Blair, D. Black): survey of Phillip's Point for evidence of extant archaeological deposits; the survey was successful and resulted in the relocation of the Newton's Point site (BeDq11).

The formal field season consisted of 10 work periods, beginning on May 1, 1995, and ending on October 13, 1995 (Appendix B). These 10 work periods consisted of 50 days in the field, and a total crew of 45 (with an average crew size per work period of 4.5). The crew consisted of a project director (S. Blair), a field supervisor (B. Murphy), and between 1 and 6 field assistants. Almost all of these field assistant were volunteers. The field work portion of GMAP II was funded by the provincial archaeology branch, Archaeological Services

(Dept. of Municipalities, Culture and Housing), and the Anthropology Departments of the University of New Brunswick and Saint Thomas University.

METHODS

The logistic constraints and work schedules resulted in the combination of analyses of existing archaeological collections, the soliciting of local informants for information, foot surveying for sites, resource analysis, and the controlled excavation of deposits.

Local informants

The seasonal and permanent residents of the GMA possess a wealth of knowledge about its past and present. The active dulse and clam industries of the GMA result in local people who have had years of experience walking the beaches closely examining their surfaces. While these people might not be actively looking for artifacts, they may notice any archaeological material lying on clam or dulse beds. Furthermore, the local oral traditions are very rich and full of information about the past. In some cases, this information pertained to traditional historic Passamaquoddy use of the GMA, while in other cases it involved stories of artifact finds and sites. To solicit this kind of information, signs were posted outside of the field office (the Grand Manan Whale and Seabird Research Station, in North Head), and regular spots were placed on the local cable service. The project director was also generally available, either in the field, at the field office, or more formally, through talks at the local schools, the Historical Society, and the media.

Collections analysis

Coastal archaeological sites in the Maine/Maritimes area are continually being eroded by rising sea-levels. Although fragile materials are often immediately destroyed by this activity, durable archaeological material such as lithic artifacts often remain for a short while in the intertidal zone in front of the site before being carried by successive tides and wave action down the beach and into the subtidal zone. Modern development and activity also exposes archaeological deposits. The exposure of archaeological materials to modern residents and passers-by results in the accumulation of private and public collections of artifacts. During the preliminary stages of this research, six collections of artifacts reputed to be from the GMA were examined. When possible, typological analysis and raw material identification were carried out on these artifacts.

Foot survey and resource analysis

The field crew conducted foot surveys by walking along eroding and disturbed surfaces, and beaches. The surveys served two purposes: (i) the recovery and/or recording of artifacts, debitage, or archaeological features, and (ii) an examination of local geomorphology, and organic and inorganic resources. They were concentrated in areas of archaeological potential (i.e., previously recorded find spots, areas with geomorphological features similar to those in other site locales in Charlotte County, and areas noted for Native activity in ethnohistoric traditions), as well as in areas with high resource potential (i.e., where high grade "tool stone" might be found). In some cases, several surveys of the same area were conducted, so as to control for changes in tide, and to monitor changes in eroding surfaces. The elements of the foot survey are quantified in Table 3.1. The distances given represents the total distance surveyed (perhaps accumulated over several visits).

Testing and excavation

Because of the visibility of crew and research efforts of the GMAP II within the community, and since this work may be followed in the future with further archaeological excavations, it was decided to avoid using "shovel testing", and to restrict testing and excavation to sections of sites that had been mapped and "gridded" so as to facilitate future location of these units.

Formal archaeological excavations were conducted on two of the prehistoric archaeological sites the Newton's Point site (BeDq-11), and the Baird site (BdDq-3). The methods used were those of standard

Table 3.1: *The foot survey of the Grand Manan Archipelago.*

General area surveyed	*Distance (km)*	*No. of Surveys*	*Total No. of Surveyors*
SOUTH HEAD BEACH	1.5 km	3	10
DEEP COVE BEACH & BROOK	1.5 km	3	8
SEAL COVE BEACH	0.5 km	1	3
SEAL COVE BROOK	1.0 km	2	4
RED POINT	0.5 km	1	6
LONG POND BEACH	1.5 km	1	5
INGALLS HEAD	3.0 km	2	4
CHENEY ISLAND	7.0 km	1	4
WHITEHEAD ISLAND	1.0 km	2	1
GRAND HARBOUR & BROOK	7.0 km	1	4
ROSS ISLAND	9.0 km	1	2
WOODWARDS COVE - THOROUGHFARE	3.0 km	1	5
NANTUCKET ISLAND	2.5 km	1	6
CASTALIA MARSH	1.0 km	1	3
STANLEY BEACH AND NORTHHEAD	1.5 km	1	3
DARK HARBOUR	6.0 km	3	14
FISH HEAD	1.0 km	1	2
WHALE COVE	2.0 km	4	17
INDIAN BEACH	4.0 km	1	2
MONEY COVE AND INTERIOR	9.0 km	1	3
EEL POND AND INTERIOR	1.0 km	1	6
EEL BROOK & BEACH	2.5 km	2	8
KENT ISLAND	4.0 km	2	4
Total	**71 km**		

archaeological practice — the use of fine tools (no larger than a trowel), the recording of all finds in as many formats as possible (maps, photographs, video, hand-drawings, notes), and strict attention to the three dimensional provenience of all culturally derived materials (artifacts, features) and potential markers of site formation processes (evidence of disturbance, hydrology, soil development). All soil was screened through 1/4" mesh screen. The excavation technique was enhanced by bulk and column sampling. The bulk sampling involved collecting ca. 300 to 500 gms of soil from areas with concentrations of organic material or charcoal. The column samples involved taking a complete sample in 10cm levels, from a 15 by 15cm column set in one profile of a unit. The sites were sampled in 1m^2 units, with all units designated and located on a site-wide alphanumeric grid and a universal datum point. In both cases this datum was tied into mean low tide to facilitate future reconstruction of the exact activities of this project and to enable further archaeological excavations. Upon completion of the work all units were backfilled and the sods carefully replaced.

Using these methods, 19 - 1 m^2 units were excavated from the Newton's Point Site (BeDq-11), and 5 - 1 m^2 units were excavated from the Baird Site (BdDq-3). In addition, 3 column samples and 2 bulk samples were removed from Newton's Point, and 2 bulk samples and 2 column samples were removed from the Baird site. On both sites, this excavation procedure was coupled with surveys of the beach, erosional face and site surfaces for cultural material, and studies of the micro-environmental variables (geology, botany, topography, including site orientation, beach gradient and character).

RESULTS

Because of the wide-ranging methodology employed during GMAP II, the resulting data consist of a diverse mix of sites, collections and accounts. Several criteria can be applied to this data to sort it into useful categories:

(i) the association of information with a specific source or location (referred to in this chapter as "provenience", and is applied specifically at the level of the archaeological site, not the artifact within the site)
(ii) the presence of analyzable archaeological materials (i.e., artifacts, bioarchaeological specimens or ecofacts),
(iii) the presence of extant deposits containing past cultural material,
(iv) whether any subsurface examination of the site was carried out.

Using these four criteria, the data can be sorted into five ascending levels of utility for interpreting the prehistoric past (Table 3.2). The archaeological data from the GMA investigated during the GMAP II can be organized according to these levels (Table 3.3).

In the remainder of this chapter, the archaeological data from the GMA will be discussed, from the least reliable, Level 1 information (the oral accounts), through to the most reliable, Level 5 information (the excavated sites).

Oral accounts

These accounts were solicited and recorded as a part of the research agenda with the expectation that they would lead to higher level archaeological information. In most cases, however, they did not. They are reported here because they provide a glimpse of potential past site densities and locations, and may assist with future research.

Table 3.2: Levels of utility for archaeological interpretation

Level	*Criteria*	*Type of information*
Level 1	Location, no artifacts, no deposits, no testing	Oral account
Level 2	No location, artifacts, no deposits, no testing	Unprovenienced collection
Level 3	Location, artifacts, no deposits, testing	Provenienced collection
Level 4	Location, artifacts, deposits, no testing	Extant site
Level 5	Location, artifacts, deposits, testing	Excavated site

***Table 3.3**: The ranking of archaeological data examined during the GMAP II*

Level	*Site Name*	*Location*	*Artifacts**	*Deposits*	*Tested*
1	Ross Island	Y	n/a	N	N
1	Seal Cove	Y	n/a	N	N
1	Woodward's Cove	Y	n/a	N	N
1	South Brook Beach (BdDq1)	Y	n/a	N	N
1	Dark Harbour (BeDr1)	Y	n/a	N	N
2	The Smithsonian's GM collection	N	SI	N	N
2	The Grand Manan Maul	N	GMM	N	N
2	The North Head Axe	N	Priv.	N	N
2	The Romig Collection	N	Priv.	N	N
2	The Ritchie Point	N	GMM	N	N
3	Nantucket Island	Y	GMM	N	Y
3	Kent Island site (BdDq6)	Y	GMM/Priv.	N	Y
4	Ingall's Head/Mike's Point	Y	GMM	Y	N
4	Indian Camp Point (BeDq12)	Y	GMM/UNB	Y	N
5	Newton's Point site (BeDq11)	Y	UNB/Priv	Y	Y
5	The Baird site (BdDq3)	Y	UNB	Y	Y

* This column indicates the repository of the artifacts; SI = Smithsonian Institution, GMM = Grand Manan Museum, Priv. = a private collector, and UNB = Dept. of Anthropology, University of New Brunswick.

Ross Island

A single projectile point was reported to have been recovered from the south beach of Ross Island, less than 1km from Indian Camp Point (Figure 3.1). This point was described as being "ground", instead of "chipped". The original, which is in the possession of Mrs. Kathleen Tate of Whitehead Island, was unavailable for examination during the 1995 field season, although it is hoped that this artifact can be examined at a future date. It is possible that this is a groundstone projectile point, which would be a technological trait of Archaic period points (ca. 3500 to ca. 9000 years ago). However, it is more likely, given the structure of the beaches in the area, and the presence of a (probable) Woodland period site less than 1km away, that it is a highly beach-rolled flaked stone point. Long-term beach rolling of artifacts wears away ridges and flake scars and will ultimately produce a sheen or polish similar to grinding.

Seal Cove

Mrs. Sharon Greenlaw of GMI reported collecting arrowheads from Seal Cove Brook as a child. Unfortunately none of these artifacts are known to be extant. The locale is now a part of the Brookside Golf Course in Seal Cove (Figure 3.1). Mrs. Greenlaw reported that the site was being cut through by the brook near a large white boulder, just below the first hole of the golf course. At this place she recalled finding a great many arrowheads, but no other materials. Based on her age and account, she would have been actively collecting from this site between 25 and 30 years ago.

No further cultural material was encountered during subsequent foot surveys of the banks and stream beds of Seal Cove Brook, although the large granite glacial erratic that matches Mrs. Greenlaw's description was easily located. It is now over 1m from the eroding edge of the brook, in the centre of the stream. It seems likely that any small, localized deposits associated with this boulder have long since washed away. Less than 500m downstream from this boulder, the community of Seal Cove has encroached considerably on the stream course and coast, with much of the low-lying areas reclaimed using larger rocks, wire rock cages, fill, and pilings. This may have contributed to the lack of success.

The area around the boulder is a favourable one; clay deposits were encountered along the banks of the stream, the ground is gently sloping, and the thick soil layers that have accumulated over the clay are sandy, well-drained, and relatively fertile. It is hard to assess to what extent this area has been modified by farming or recent construction and landscaping. Mrs. Greenlaw's description, and the lack of extant artifacts or deposits, suggests that the site was very small and localized, and may have consisted of an artifact cache or ritual site of some kind.

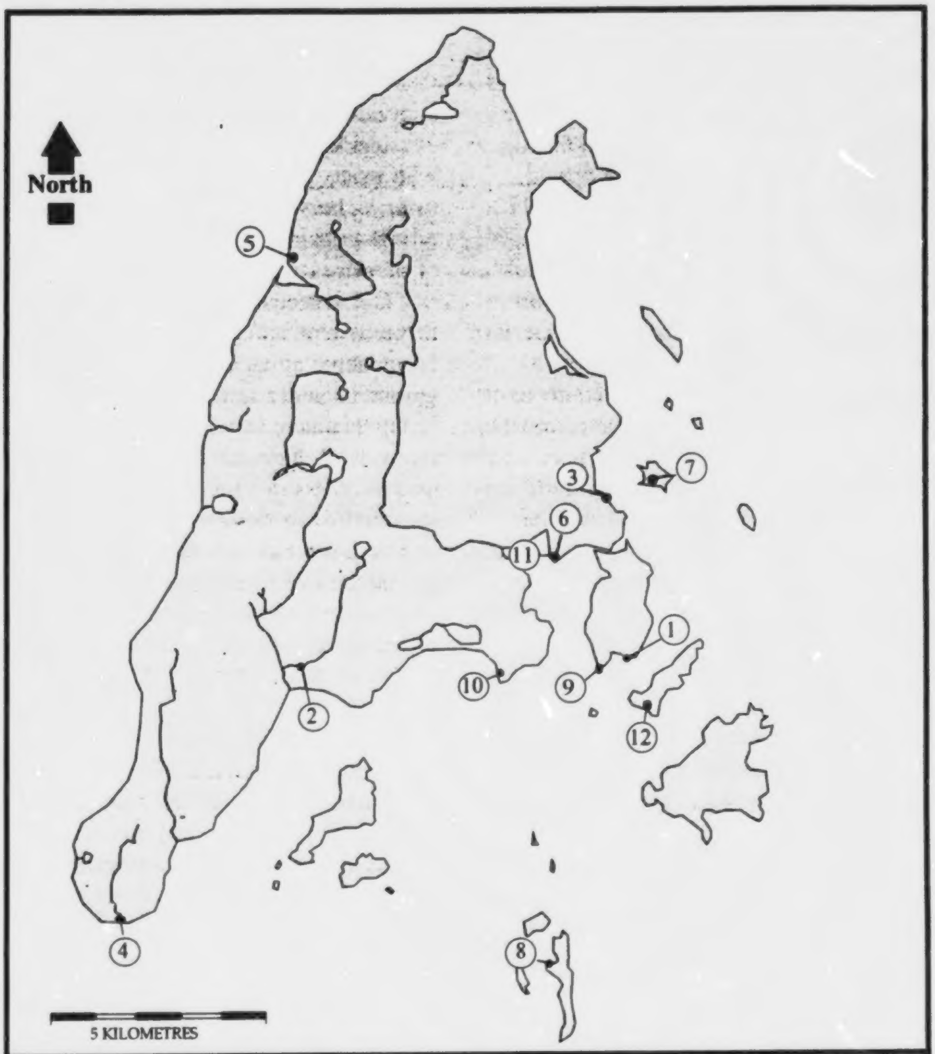
Woodward's Cove

A single arrowhead was reported found on the beach, just south of the community of Woodward's Cove (Figure 3.1). This specimen was reported to be from immediately adjacent to the lobster pounds. This area was carefully foot surveyed, but no further cultural material was encountered. The original find has been lost, as have further clues to its origins.

South Brook Beach (BdDq-1)

This site (in conjunction with the Dark Harbour site, see below) consists of a professionally reported verbal account of a find spot. South Brook Beach was designated in 1988 as the result of the discovery of a small scatter of lithic debitage by Bruce Bourque (Maine State Museum) and Robert Doyle (Maine geologist) who were conducting

***Figure 3.1:** The prehistoric archaeological resources of the Grand Manan archipelago.*



1 Ross Island (O)
2 Seal Cove (O)
3 Woodward's Cove (O)
4 South Brook Beach (O)
5 Dark Harbour (O)
6 Romig property (PC)
7 Nantucket Island Shell Heap (PC)
8 Kent Island (PC)
9 Indian Camp Point (US)
10 Mike's Point (US)
11 Newton's Point (ES)
12 Baird Site (ES)

(O = oral account, PC = provenienced collection,
US = unexcavated site, ES = excavated site)

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a geological survey for potential stone tool material. As these researchers were focusing on geological resources, and did not have a New Brunswick archaeological license, the flakes were not collected.

South Brook drains Gull Heath, which is immediately above and north of Southern Head (Figure 3.1). The brook descends from the Heath (a height of 90 m) through a narrowly incised gorge. At its mouth, the gorge opens into a rocky terrace (ca. 2m by 3m in size). The stream runs to the north of this terrace, and feeds into a small, brackish pond. The pond is maintained by a barachois composed of large, round cobbles. These cobbles also cover the shallow, low-gradient beach in front of the barachois. Adjacent to the brook, on the bank opposite (north of) the terrace, a small cottage has been built. Part of the retaining wall at the base of the cottage has impacted on and partially diverted the stream. Whether it was because of the nature of the beach (high energy, large cobbled), the diversion of the stream, or the lack of any further archaeological material being present, none of the subsequent surveys of this area (three foot surveys in all involving a total of 10 surveyors) have produced any archaeological material. Although permission of the landowner was obtained to test portions of the terrace, it was not undertaken because of potential for poor results (due to the lack of visible prehistoric material or features) and because of the likely negative impact on the landowner's property.

Dark Harbour (BeDr-1)

The Dark Harbour site was designated as a result of the recovery of a stone scraper or knife in the 1960's by R. Pearson of the Archaeological Survey of Canada). Although this information was transmitted to the present in a written (unpublished) report, the nature and quality of the information is similar to the above oral accounts (anecdotal, and lacking corroborating material evidence including the artifact), so for analytical purposes it will be treated as an oral account.

Dark Harbour presented even greater problems than South Brook Beach because of the area involved. Dark Harbour is a large natural harbour (ca. 700m by 300m) ca. 5km south of Northern Head on the west side of GMI (Figure 3.1). It is surrounded on all sides by towering basalt cliffs (over 200m high) and appears to be at least partially formed by Dark Harbour Brook, which flows westward through a steep and narrow gorge into the harbour. At its mouth is a low terrace, which may be periodically inundated with salt water. Across the mouth of the harbour there is a large, naturally occurring shingled barachois. This is periodically dredged to keep the harbour open to boats, and so it can be used as a large natural weir (fish trap). The site record on file with the Provincial Archaeology Branch does not indicate details of the artifact or its provenience. Nonetheless, the beaches at Dark Harbour were surveyed three times (with a total of 12 surveyors). No convincing evidence of prehistoric activity was encountered. With such a large area and without a specific site locale, no subsurface testing of the site was attempted.

Unprovenienced artifact collections

The Smithsonian's Grand Manan collection

This collection appears to consist of artifacts collected during Baird's 1869 visit to the GMA. Unfortunately they have become so mixed that the provenience of specific artifacts is no longer known. Based on an informal typological assessment, the mixed collection contains artifacts that range in age from the Late Archaic period (ca. 3500 to ca. 5000 years ago), to the late Maritime Woodland period, the period immediately before contact with Europeans (ca. 500 years ago). Most of the typologically dateable artifacts, however, seem to date to the more recent part of this range. A total of 144 artifacts collected from the GMA by Baird were found at the Smithsonian's Museum Support Centre. The character of this collection is illustrated in Figure 3.2a-c. Several observations may be made about this collection:

(i) there are no stone artifacts made from brightly coloured chert,
(ii) despite their prevalence on many Late Maritime Woodland sites (Bourque 1992), there is only one steep-edged endscaper (thumbnail scraper),
(iii) there is only one piece of ground stone, a roughly shaped celt, and
(iv) there are no prehistoric ceramic sherds, even though Baird collected some from the Quoddy region, and so would have recognized prehistoric ceramics if he had seen them.

These observations suggest a number of questions. Are the expected materials that are not present the product of unusual assemblage composition? Were they lacking in the original archaeological assemblage or is this effect a result of a collection bias? One possibility is that Baird did not actually recover that much material, and that the Smithsonian collection represents artifacts donated by landowners. If this were the case, the composition of the assemblage might result from the donors selecting out for themselves brightly coloured cherts and ground stone artifacts before giving them to the museum. Unfortunately, the lack of provenience information severely affected the interpretive utility of the Smithsonian's Grand Manan collection.

Figure 3.2a: Proportion of materials represented in the Baird Collection

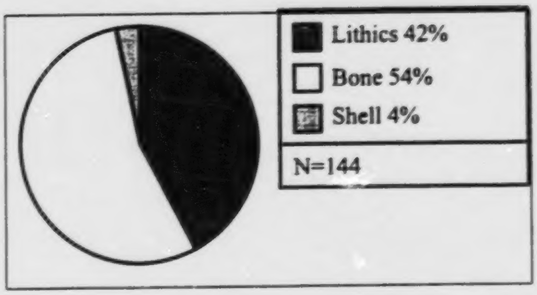


Figure 3.2b: Proportion of lithic artifact classes represented in the Baird Collection

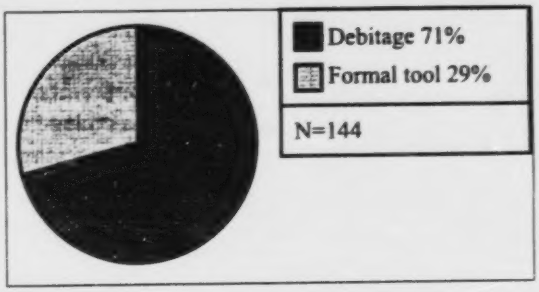
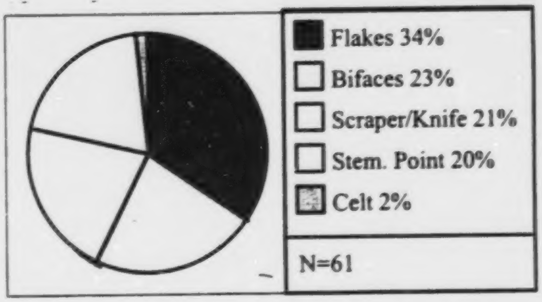


Figure 3.2c: Proportion of lithic artifact types represented in the Baird Collection



The Grand Manan Maul

The Grand Manan Museum has several unprovenienced specimens. Most of these are either undiagnostic (i.e., flakes), or are "pseudo"-artifacts (i.e., geological oddities, sculpted by nature). However, one of these specimens, a large maul, is definitely of human manufacture. It is made from a large, ovoid, black (probably mafic volcanic) cobble, which has a groove pecked around the midsection. Both ends also exhibit evidence of pecking or wear. Typologically, it is similar in construction to grooved axes which have been attributed to the Susquehanna tradition (ca. 3500 to ca. 4000 years ago; see Rutherford 1989: 163, and below), however, its morphology clearly indicates it functioned as a maul.

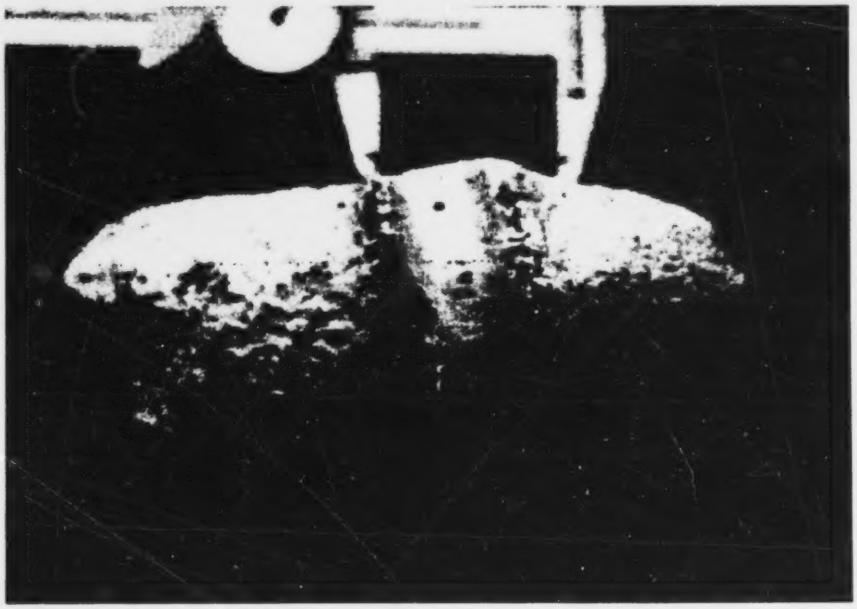
The North Head Axe

A single groundstone axe was recovered from near the community of North Head by Mrs. Small, some time in the mid-20th century (Plate 3.1). This axe is now in the possession of Mr. Basil Small of North Head. The axe is fully grooved, with a pointed poll and a broken bit. It is ca. 17cm long, with a maximum width of 9.2 cm, and a maximum thickness of 6.4 cm. The neck is 8.0cm wide and 4.4cm thick. This axe is similar to axes of the Susquehanna tradition (ca. 3500 to ca. 4000 years ago) from Maine and further south in New England, and the central coastal U.S. (Bourque 1995: 118; Rutherford 1989: 162). Mr. Small was unable to recall where the axe was found, although he believes it may have been associated with the garden on his property, or perhaps the pipestone quarry at Fish Head (Gesner 1981).

The Romig collection

A collection of 4 projectile points (Plate 3.2) and a swordfish bill were brought to the attention of the crew during the 1995 field

Plate 3.1: *The North Head axe (note: the surface has been painted light green by the collector).*



season by Rev. David Romig, the current landowner of Phillip's Point (Figure 3.1). Phillip's Point is the location of the Newton's Point site (BeDq-11). The collection was included with other household items when the Romig's purchased their house more than 30 years ago. Although the exact provenience of the collection is not known, the previous landowner indicated that it was from the property, and had been collected earlier in this century. Two of the points are complete specimens. The first (Plate 3.2a) is a medium-size thick point, with prominent side notches, a narrow, triangular blade, with straight edges and a straight base. It is made of a highly bleached fine-grained volcanic or chert. Points of this style have been recovered from the Central Coast of Maine (Bourque 1992: 199-200, 1994: 28; Snow 1980: 214-215), the Quoddy region (Sanger 1987: 37-38), and the broader Northeast (Ritchie 1971: 37, 91) dating to the Late Archaic period (ca. 3500 to ca. 5000 BP). The second complete point (Plate 3.2b) is a small straight-stemmed point with a short, triangular blade with straight edges and a straight base. The point appears to be covered with a shellac or resin, giving it a glossy brownish yellow appearance, but obscuring the material of manufacture. Similar points have been recovered in Late Archaic contexts in the Maine-Maritimes area and more broadly in the Atlantic region, including Newfoundland/Labrador (Bourque 1992: 189, 203, 1995: 45; Snow 1980: 215). The other two points are both are missing the corners of the base, making a typological assessment difficult. Both are medium-sized points. One (Plate 3.2c) is manufactured on a bleached chert which was originally dark grey in colour (as determined by post-curation breakage). The other (Plate 3.2d) is made of a bleached fine-grained volcanic or chert. It has a broad, rounded blade, with excurvate edges, which are general characteristics found on points in the Northeast dating from the Late Archaic and Early Woodland periods (Bourque 1992: 191; Ritchie 1971: 12, 16).

A swordfish bill was also among the household items that came with the purchase of the house. Unfortunately, there was no accompanying information about its provenience. It may be the product of a recent (historic) fishing trip and a radiocarbon assay has not been run on the specimen to determine

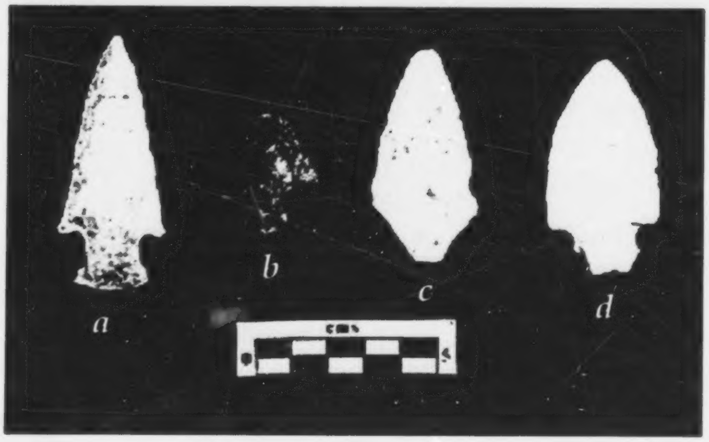


***Plate 3.2:** The Romig collection, reputedly recovered from Phillip's Point (photo credit: David Black).*

its possible antiquity. Suspicions of its possible archaeological origin arise from the association of swordfish remains with Late Archaic sites, such as Turner Farm in the Central Coast of Maine (Bourque 1995: 88). The Late Archaic nature of the Romig projectile points fuel this speculation to a certain extent. The specimen is ca. 1m long, and in very good condition. It has not been visibly altered to form an artifact.

The Ritchie Point

This artifact is a long, finely made point (ca. 17cm long and 5cm wide), with a small, expanding (side-notched) stem. Although the surface of the artifact was covered with crustose-coralline algae, a corner had broken off recently exposing the tool material. It appears to be a yellow-beige high quality chert. This material is unlike any other encountered in Grand Manan collections or assemblages. The artifact is stylistically similar to projectile points from the Northeast that date to ca. 5000 to ca. 7500 years ago, or the Middle Archaic period (Dragoo 1991: 17). The artifact currently resides in the Grand Manan Museum, having been donated by its collector (Mr. Ritchie). Early and Middle Archaic artifacts are periodically recovered in scallop drags in the area but to date have not been found in archaeological deposits in southwestern New Brunswick (Turnbull and Black 1988). Based on the lack of sites, archaeologists suspect that coastal sites from this time period are entirely subtidal now due to rising sea-levels. This artifact seems likely to be derived from a site of this kind.

Provenienced collections

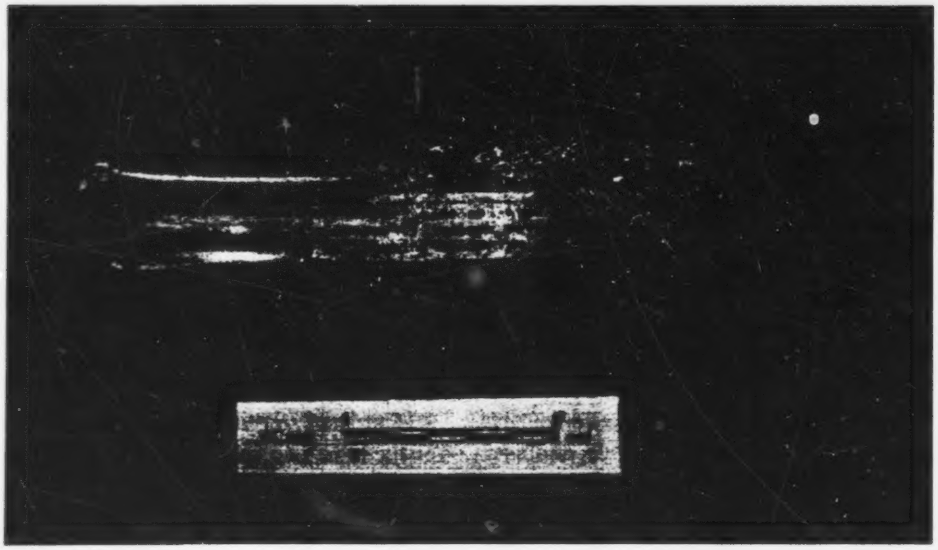
Nantucket Island "shell heap"

Nantucket Island is a medium-sized island, adjacent to Woodward's Cove, and connected to GMI during extreme low tide by extensive mud flats (Figure 3.1). The Nantucket Island shell heap was first recorded by Baird in 1869. Unfortunately, subsequent explorations have failed to find any trace of these deposits. These explorations included surface survey in the 1960's (D. Sanger 1993: pers. comm.), surface survey in 1983 (Black 1984), and surface survey and test excavation in 1993, as part of the preliminary phase of GMAP II. The 1993 survey involved a crew of 6 archaeologists, and 4 days of survey and testing. The foot survey focused on inspecting all eroding and exposed surfaces, and examining land surfaces and geomorphological features for potential site locations. Two low open areas with reasonable site potential were selected, one on the north side of the island, and one on the south side (Plate 3.3). Five 50cm^2 units were excavated in the north field. No cultural material was recovered. Another six 50cm^2 units were excavated in the south field; a few historic artifacts (a nail, and sherds of pearlware) were recovered, but no prehistoric artifacts were encountered. Unfortunately testing was restricted to the 30m adjacent to the beach, as a small herd of cattle, including a large bull, had been allowed to run feral on the island. The bull patrolled the south field regularly and monitored the archaeological activity carefully. In light of the possible risk to the crew, testing was limited to the lower portion of the field, near the steep bank and the beach and water. However, the erosion on all banks of the island was severe (Plate 3.3). It seems likely that any traces of a prehistoric site of any size would have been visible in the edges of the field and the erosional surface.

There are several archaeological collections in the Grand Manan Museum that were given as gifts by local people. One of these is a collection donated by noted naturalist Robert Moses, and is recorded as being from Nantucket Island. Included in

Plate 3.3: *The southern exposure of Nantucket Island, showing erosion.*

Plate 3.4: *A ground stone gouge from the Moses collection, Grand Manan Museum; recorded provenience is Nantucket Island.*



this collection is a medium-sized, half-grooved ground stone gouge (Plate 3.4). This is a classic Late Archaic artifact (ca. 3500 to ca. 5000 years old), similar to ones recovered from Late Archaic sites throughout the northeast (Snow 1980: 213; Willoughby 1935: 35). There are also seven unstemmed biface fragments, six of which are made from local grey to brown quartzite, and one of green felsite. The only stemmed point in the collection is a side-notched red quartzite projectile point, which, according to the museum's accession records, was identified in the 1950's by G. Watson of the ASC as a Middle Archaic point style (Brewerton Side-notched, ca. 5000 years old). However, locally, medium-sized, narrow side-notched points are typical of the Late Maritime Woodland period (i.e., Black 1992 ; Bourque and Cox 1981; Sheldon 1988). If these artifacts are derived from Nantucket Island, they suggest activity during the Archaic, Woodland and historic periods.

Kent Island site (BdDq-6)

Kent Island is a part of the Three Islands chain, which, of all of the sizable offshore islands, is the furthest from GMI (Figure 3.1). The Three Islands are 6km southeast of Ox Head, the nearest point on the main island, and 4km south of Whitehead Island. All of Kent Island is currently owned by Bowdoin College, Maine, which maintains the Bowdoin College Scientific Research Station located on the eastern side of the Island. This research station supports biological (primarily ornithological) research every summer.

The first suggestion of prehistoric settlement on Kent Island was the recovery of a large stemmed blade in a scallop drag, off the north end of the island (see the Ritchie point, above). Subsequently, two artifacts have been recovered from beaches around a small harbour oriented to the north, known as The Basin (Figure 3.3). In July of 1992, one of the biologists at the Bowdoin College Research Station recovered a projectile point from the beach just north of The Basin. This point is slender and thin, 5.5cm long and 1.8cm wide, and is manufactured from a dark green to black fine-grained volcanic (Figure 3.4a). The blade is lanceolate; the shoulders slope into a slightly flaring stem with a straight base. The slight expansion of the stem gives the impression of very wide side-notches. The point has a slight polish to it, which may result from the artifact being slightly beach-rolled. A second prehistoric artifact was recovered from the beach just south of The Basin in August 1995, by a crew member (Cara Greenlaw) who was participating in some of Bowdoin College's ornithological research at the time. This artifact is a large unstemmed biface, which is 10.9cm long and 5.1cm wide (max.) (Figure 3.4b). It has a slightly rounded base, and a rounded or broken tip. The sectional view is asymmetrically biconvex, as one surface has a large raised area at the midpoint, where the tool-maker was apparently unable to further thin the biface. It is made from a medium-grained grey quartzite, a material which is commonly found as cobbles on the beaches of Kent Island and the GMA. This artifact was found embedded in a lens of peat that was apparently being bisected by the erosional face of the beach.

Since this site was reported after the summer field season had ended, a separate trip to Kent Island was organized in October 1995. The expedition consisted of S. Blair, D. Black, and C. Greenlaw. The beaches and land surfaces adjacent to and within The Basin were carefully examined, with particular attention paid to the specific sections of the beach where the artifacts had been found.

The beaches around The Basin are composed of large cobbles, coarse gravel and rounded bedrock outcrops. In a number of places, and at varying levels, thick beds of subareal peat can be seen eroding into the intertidal zone (Plate 3.5). In places this peat is studded with tree stumps. Similar evidence of a relic forest has been noted on many beaches in the GMA, including some on Whitehead Island, and on the main island at Castalia. In 1977 a wood sample was recovered from Long Point Beach, Whitehead Island, 4m below the high water line (spring tide); this sample was radiocarbon dated to 3300±60 BP (Legget 1981).

To ascertain whether or not cultural layers were overlain by or embedded in the peat, 6 small shovel tests were conducted in the general area where the stemmed point was recovered, north of The Basin (Figure 3.3). All but one of these was below the high tide line, and the last was at the high tide line. A peat layer, between 20cm and 30cm thick, was found in each of the test units. The peat was very homogeneous and covered by thick beach gravel and cobbles. There were no black organic lenses, cultural material, signs of features or other evidence of human occupation. Two larger shovel test units were placed at the high tide line in the location where the unstemmed biface was recovered (south of The Basin). In these test units, the gravel and cobble cap was between 30cm and 100cm deep; recent historic debris (a gum

Figure 3.3: The inferred size and location of the Kent Island site(s), BdDq-6.

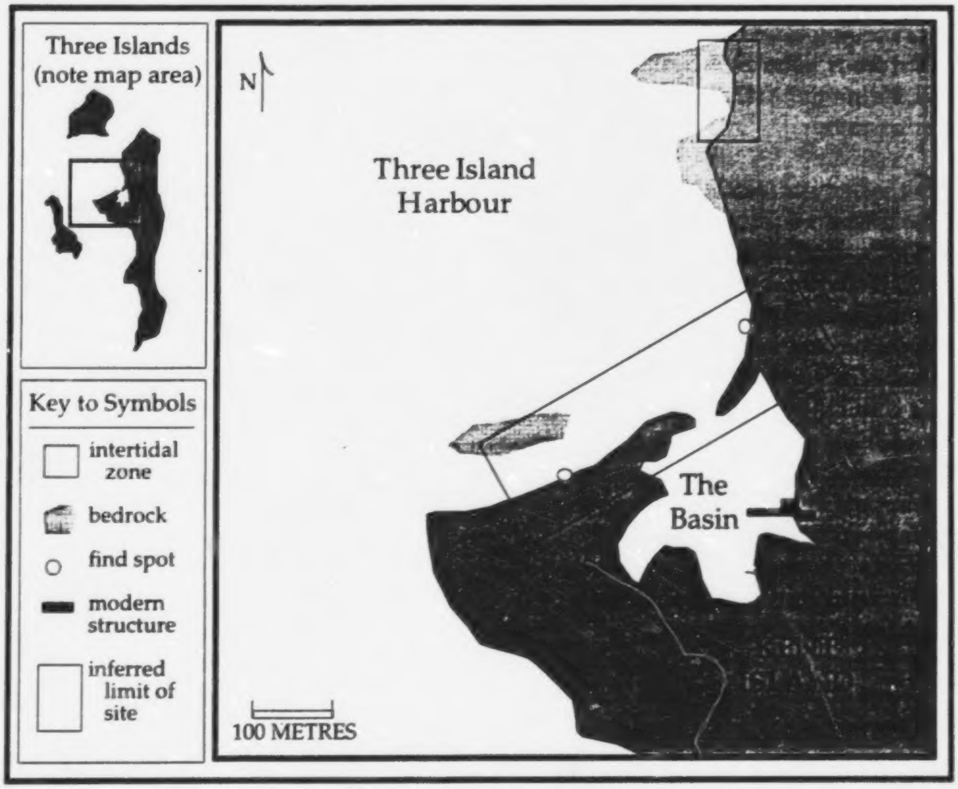

Three Islands (note map area)
Key to Symbols
intertidal zone
bedrock
find spot
modern structure
inferred limit of site
N
Three Island Harbour
The Basin
100 METRES

Figure 3.4: *Line drawings of artifacts recovered from Kent Island; (a) projectile point of fine-grained dark volcanic, and (b) biface of coarse-grained grey quartzite*

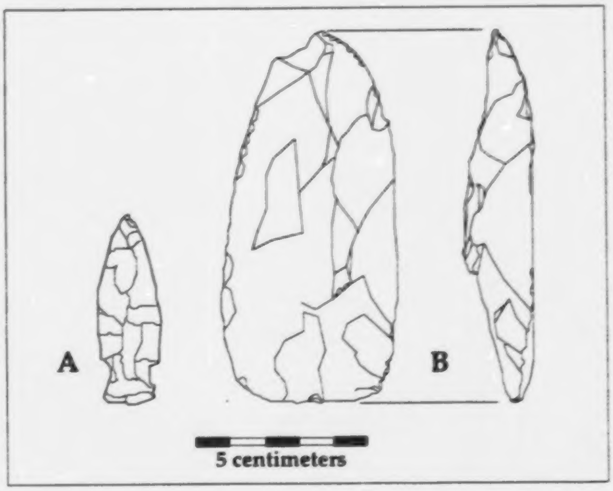
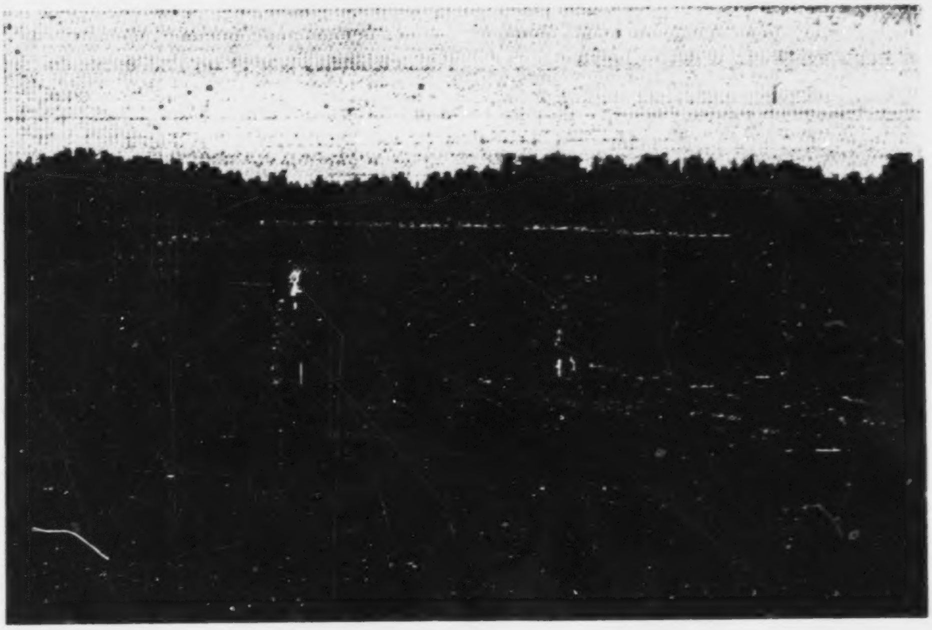


Plate 3.5: *Layers of peat eroding onto the beach of Kent Island, near The Basin, and in the Kent Island site area (BdDq6) (photo credit: David Black).*



wrapper and bottle glass) was found mixed throughout this layer. The peat layer encountered in these test units was much thinner than those encountered north of the Basin, between 5 and 10cm deep. Once again, there was no evidence of human occupation. The mixing of the gravel and historic litter suggests that this beach is extremely active. It is possible that both artifacts were in a secondary context, which makes the process of finding the exact location of cultural layers difficult.

The projectile point is similar to one recovered from an early Woodland context at the Weir site (BgDq-6) (Black 1992: 69), in association with charcoal dated to 2360±80 bp. Sanger (1987: 37-38) has suggested a date of 3000 bp or older for similar points from the Carson site. Generally, in the Northeast, wide side-notched, or 'fish-tailed' points such as these are considered to date broadly from the Late Archaic to the Early Woodland (ca. 3500 to ca. 2500 years ago) (Ritchie 1971: 39). The unstemmed point is much harder to date by typological means. Although it does not contradict the chronological assessment for the stemmed point, it is similar to habitation site material used throughout the Archaic and Maritime Woodland periods.

The Kent Island site poses several problems. The testing of the upper layers of peat did not reveal the source of the artifacts. However, the lenses of peat that are exposed lower down on the beach were not tested. These lower lenses are structurally similar to ones that have been dated from Whitehead Island to ca. 3300 years ago (see above). This date is somewhat in keeping with the chronology suggested by the projectile point. As this peat, however, is several meters below the high tide line, excavating any cultural material associated with it will be very difficult. Due to these considerations, further testing of the beaches were not attempted during GMAP II.

EXTANT (BUT UNEXCAVATED) ARCHAEOLOGICAL SITES

Indian Camp Point site (BeDq-12)

This is a probable habitation site, located on the southwestern tip of Ross Island, on Indian Camp Point (Figure 3.1). The archaeological potential of the site was ascertained through oral accounts collected

Plate 3.6: Contracting stemmed point recovered from Indian Camp Point site (BeDq-12), on display at the Grand Manan Museum.

from longtime Grand Manan residents, who recall Passamaquoddys from Pleasant Point, Maine camping at this spot, and based on the presence of a single contracting stem projectile point in the Grand Manan Museum, beach collected in the 1950's (Plate 3.6).

Currently the site area consists of a thin (30 to 50cm) cap of subareal peat lying on bedrock outcrops (Plate 3.7). These outcrops fall away steeply (2 to 4m) where the peat erodes into the ocean. Within this eroding peat, 8 pieces of lithic debitage (flakes) were recovered. On the adjacent beach, a heavily beach-rolled core/pebble chopper was recovered. All of the flakes were made of volcanics, quartzites and quartzes, materials which could have been acquired locally.

This site is currently eroding, although the erosional surfaces have mosses and a few weeds growing within them, indicating that they have recently stabilized. However, the degree of slumpage and undercut is quite severe in some places. This suggests that the site has experienced drastic, episodic erosion in the past. It seems likely that the steep bedrock outcrops running along the southern and western edges of the site afford it some protection from normal or average coastal weather, but that the site is highly susceptible to more severe storm events, which occur every few years in this region.

This site was not tested, as landowner permission for the work could not be obtained. Based on the single diagnostic artifact, which currently resides with the Grand Manan Museum, this site contains cultural deposits that date to the early Maritime Woodland period (ca. 2200 to 3000 years ago) or older. It may also contain a historic Passamaquoddy component.

Plate 3.7: *A view of the Indian Camp Point site, taken from the southern edge of the site, looking north, showing the erosional scarp.*

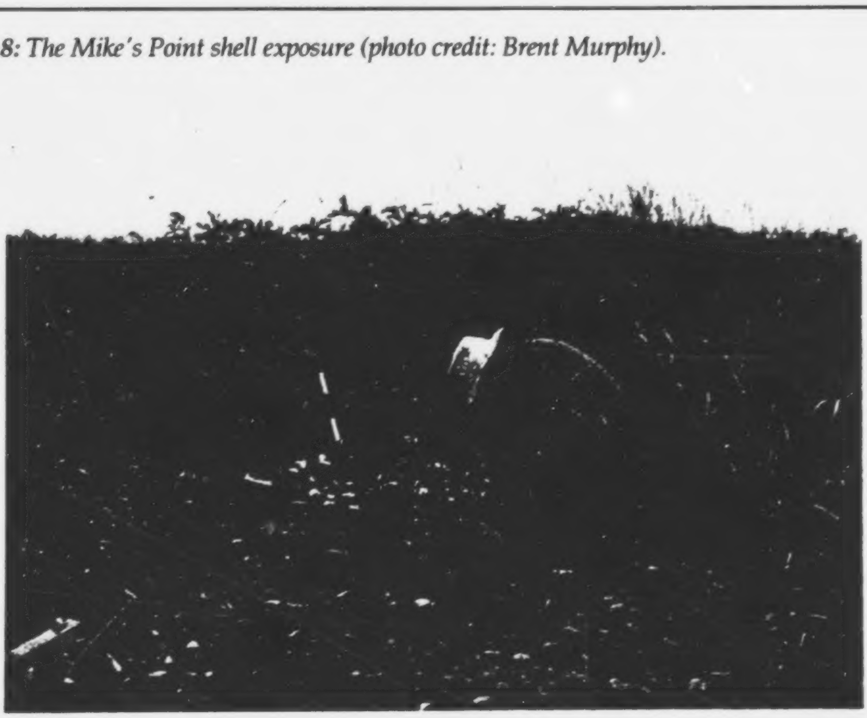
Mike's Point (Ingall's Head?) site

The Mike's Point site was encountered on one of the last days of survey and testing on GMI. The site consists of a thin lens of shell eroding from Mike's Point, along the southeast edge of Ingall's Head (Figure 3.1, Plate 3.8). The lens is very small, being less than 20cm thick, and 1.5m wide. No artifacts were encountered. A diversity of species were recovered from this erosional surface, including soft-shelled clams (*Mya arenaria*), horse mussels (*Modiolus modiolus*), common mussels (*Mytilus edulis*), and sea urchin (*Strongylocentrotis droebachiensis*).

Baird (1881) recorded a substantial shell midden in this area in 1869. The shell described above may be the final eroding portion of the back edge of the site Baird described. Certainly no other site has been recorded at Ingall's Head that might even remotely correspond to Baird's 'shell heap'. On the other hand, its presence on Ingall's Head does not verify it as one of Baird's sites, as there are a number of other potential site locations along Ingall's Head (north of Mike's Point) that have been drastically impacted by recent activity, including the Ingall's Head government wharf. If the Baird shell midden was in one of these locations, no modern evidence of it would remain. A two-holed gorget recovered more recently from the beach less than 1km south of Mike's Point provides further archaeological evidence of prehistoric activity in the area. The artifact is curated in the Grand Manan Museum and was found on the beach in the last 30 years 'near Ox Head', by a private collector. The proximity of the find may represent archaeological deposits that are eroding and being redeposited further along the beach between Mike's Point and Ox Head.

The site is on an exposed point of land,

Plate 3.8: The Mike's Point shell exposure (photo credit: Brent Murphy).



oriented to the southeast. In front of it is a very high energy cobble beach. Evidence for the intensity of subtidal and intertidal activity can be found in the presence of subtidal species on the beach, such as ten-ridged whelks (*Nucellus decemcostata*) and large mussels with crustose-coralline algae growth, and the amount of gravel and seaweed that occurs on the upper surfaces of the site. The shell is eroding out of a face of sandy soil that is 20 to 50cm deep. This eroding soil is thinly covered with sedges and beach grasses. These grasses provide a surface mat, but lack extensive or deep root systems that might bind the soil, making future and imminent erosion a certainty. As no excavations were conducted at this site, and no diagnostic material was encountered, the exact dating and nature of this site remains a mystery.

EXCAVATED SITES

The Newton's Point site (BeDq-11)

Newton's Point is located on the northern side of Grand Harbour, between Bradbury Brook and The Thoroughfare (Figure 3.1). This landform is a broad point of land oriented to the south, and is indicated on modern maps as Phillip's Point. The site extends eastward from the southern tip of the point, and is visible in the erosional face as a series of isolated patches of soft-shelled clam (*Mya arenaria*), and occasional lithic debitage and artifacts. Newton's Point is one of the sites initially recorded by Baird in 1869, although it was not rediscovered until April 1995. The excavation and analysis of Newton's Point will be discussed in greater detail in the following sections.

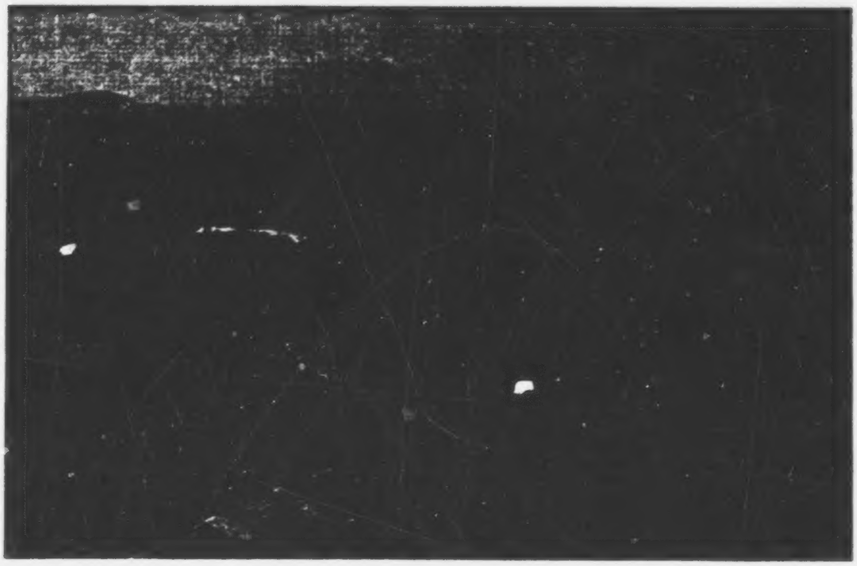
The Baird site (BdDq-3)

Originally recorded by Baird (1881), this site was rediscovered during Phase I of the GMAP, by Black (1984). Following the recommendation of Black (1984: 24), it has been named the Baird site. The surface appearance and location of this site has changed little since Baird recorded it in 1869. It is located in a field rising from behind a barrier beach formed between the Salt Pond and Freshwater Pond, at the southwest end of Cheney Island. The archaeological deposits are very widely dispersed in this field, and show evidence of patterned horizontal distribution. The excavation and analysis of this site will be discussed in greater detail in the following sections.

Chapter 4
THE BAIRD SITE AND NEWTON'S POINT SITE

In the previous chapter, four interpretive levels of archaeological data from the GMA were described. The fifth level of information, derived from extant archaeological sites with their complex array of contextual information, is the richest and most reliable for archaeological interpretation. Two archaeological sites were partially excavated during GMAP II, the Newton's Point site (BeDq-11), and the Baird site (BdDq-3). In this chapter, these sites, their contents, and some of the spatial and temporal patterns discernible within them, are presented in detail.

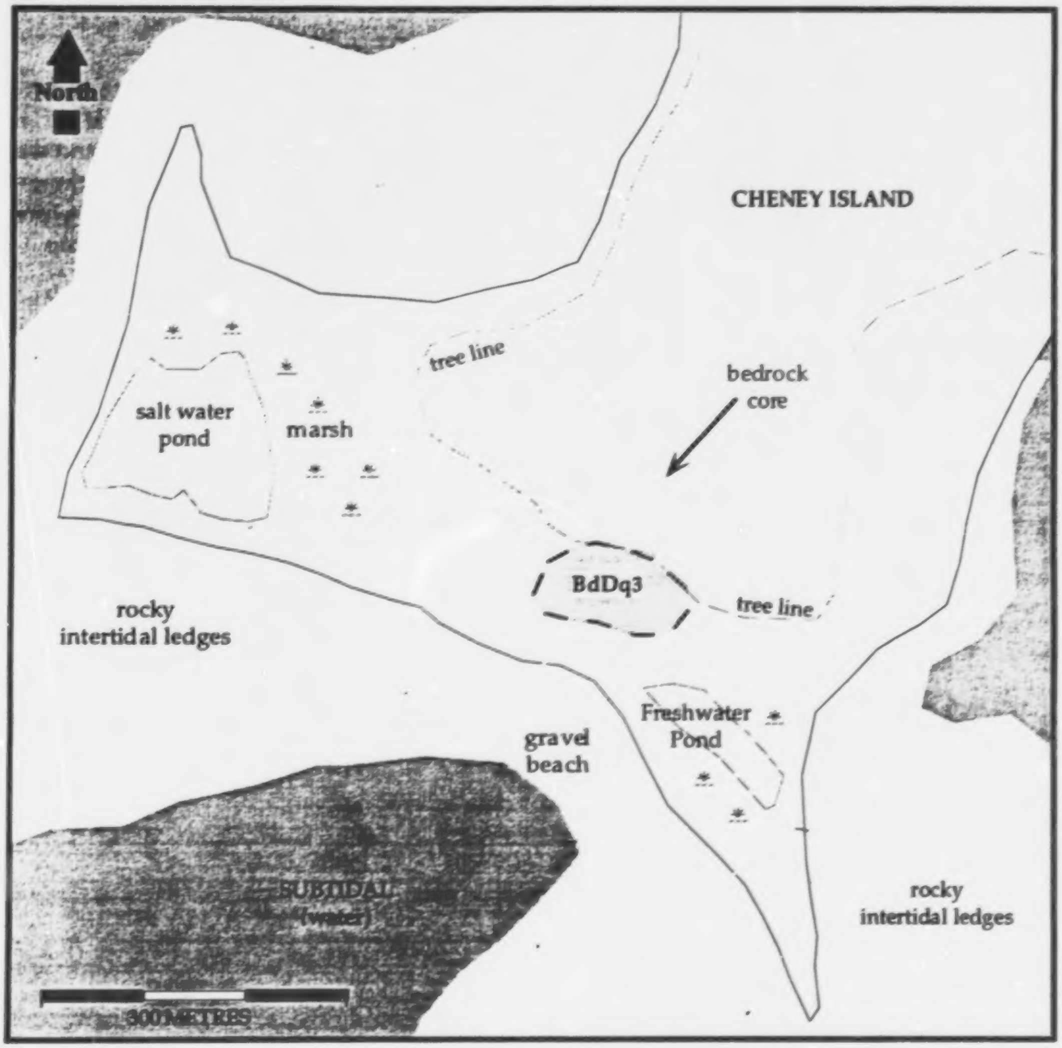
***Plate 4.1:** A view of the Baird site, taken from the northern edge of the site, looking south towards Whitehead Island.*



THE BAIRD SITE (BdDq-3)

The Baird Site is located at the southwestern end of Cheney Island in an open meadow which lies behind and above a low wet area composed of salt water marsh, bedrock knolls and a small freshwater pond (Figure 4.1; Plate 4.1). This meadow is roughly 120m long by 60m wide, with its long axis oriented east-west. Archaeological evidence, in the form of lithic debitage, fragments of shellfish and animal bones, and historic ceramics, is visible over this area in most places where the sod is broken and the earth is exposed or disturbed. During a 9 day period of the GMAP II, a crew of four mapped surface features and exposures, surface-

Figure 4.1: The southwest end of Cheneys Island, showing topographic features and the location of the Baird site (BdDq-3).


North
CHENEY ISLAND
tree line
bedrock core
salt water pond
marsh
BdDq3
tree line
rocky intertidal ledges
Freshwater Pond
gravel beach
SUBTIDAL (water)
rocky intertidal ledges
300 METRES

collected the site area for bioarchaeological samples and artifacts, and excavated five 1m^2 units from the Baird site. These activities produced a wide variety of prehistoric and historic period artifacts and bioarchaeological samples.

Site history

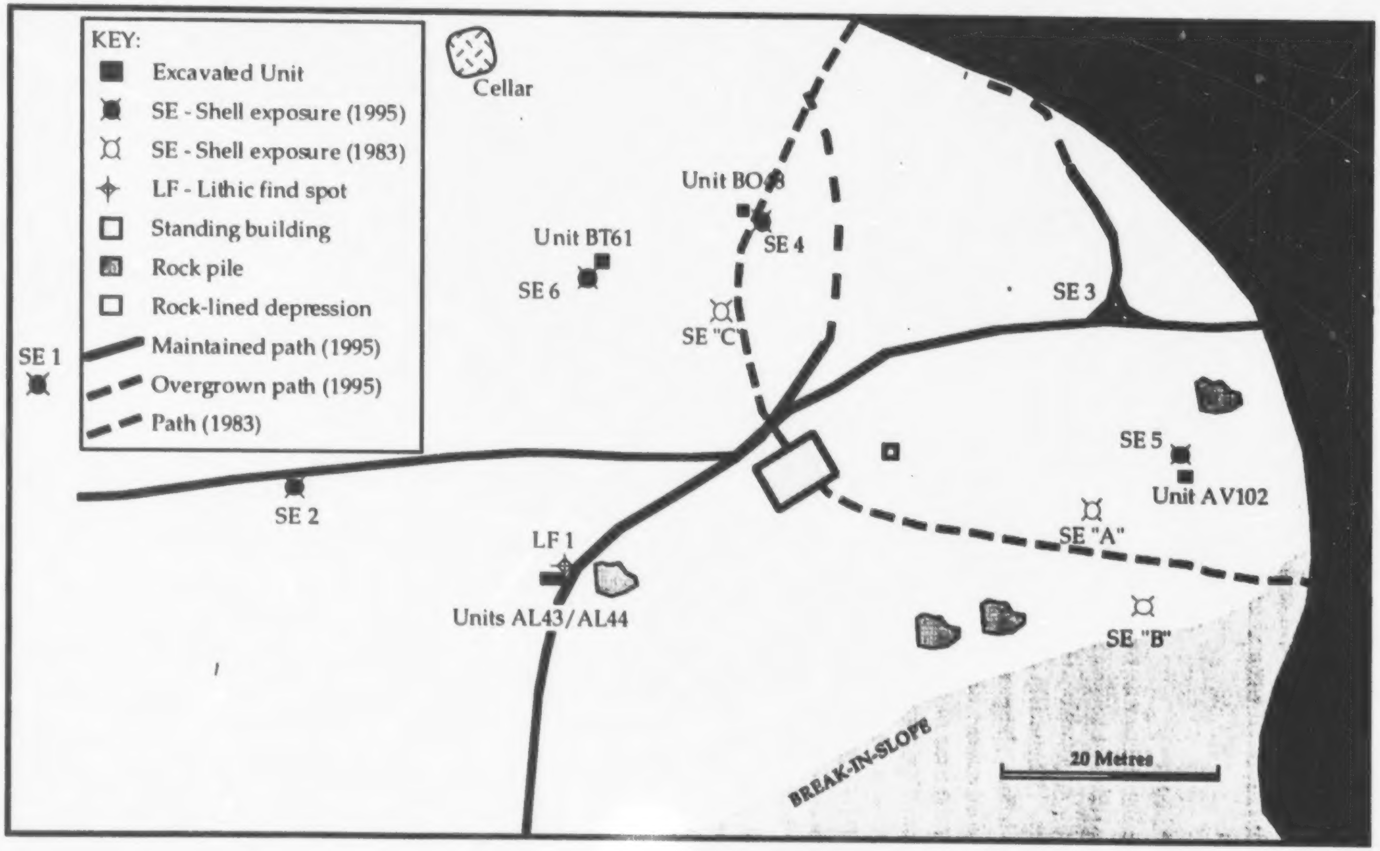
The Baird site was first recorded by Spencer Baird in 1869. His description of the site is still applicable to the modern site location: "The shells... occur on the south side of the island... They are usually high up in the field and covered with thick sod" (Baird 1881: 294). At the time of his visit, the shell deposits were small "detached heaps or hummocks" with little contiguous stratigraphy (Baird 1881: 295). Based on the low densities of artifacts and faunal material, and on his observations of its structure, Baird interpreted the site as the result of limited "casual" settlement.

Baird's report of the sites on Cheney Island is important for a number of reasons. The fact that the description of the location has changed so little in the last 126 years indicates a very high level of site stability, and very little erosion. Furthermore, his description of the structure of the site may indicate that the site had been recently disturbed (through historic activity such as ploughing, construction or mining of shell deposits for fertilizer (c.f. Ceci 1984), creating a highly visible and stratigraphically homogeneous deposit. Finally, Baird's work is the only report of the nature of the stratigraphy of the Baird site. As a result, Baird's interpretations of the significance and size of the site (small, seasonal and, indirectly, insignificant) have stood over the years (Black 1984).

Before the 1995 field season, there had been no archaeological subsurface testing of the site since Baird's visit in 1869, and perhaps never, since the nature of Baird's exploration is unknown. In 1983, Black limited his exploration to surface examination of exposed shell and bone fragments (Black 1984). As a result of this procedure he recorded and described three shell exposures in two localities. Based on Baird's notes, and his designation of two separate "heaps" as separate sites, Black gave each of his two localities a separate Borden number, although he recognized that subsurface testing would be needed to determine whether there were indeed two sites or instead, a single large site. As a result, the official records at the start of the field season referred to this site as BdDq-3 and BdDq-4. Based on the 1995 field season, the New Brunswick provincial site database coordinator, Albert Ferguson, decided to designate the whole meadow as a single site, BdDq-3. To avoid confusion, the Borden designation BdDq-4 has been "decommissioned" and will not be used for any other site.

The evidence recovered in 1995 suggests that the site has undergone (and continues to undergo) a series of historic disturbances, which vary in their impact over the surface of the site. At the top of the bedrock knoll that outcrops through (and so bisects) the site along its short (north-south) axis, is a shallow rock-lined depression, which appears to be a historic period cellar (Figure 4.2). Furthermore, several of the units produced historic ceramic sherds mixed with the prehistoric material. Although the shallow soil and the nature of the bedrock outcrop might seem to preclude ploughing of the meadow, a number of small rock-piles along the break-in-slope of the meadow suggests that it may have been cleared of moveable surface rocks, and ploughed or spaded at least once in the past. Finally, there are two modern hunting or fishing camps that are maintained on or near the site, one at its northern fringe and the

Figure 4.2: The Baird site (BdDq-3), showing topographic and archaeological features, surface finds, and excavations. (N.B.: lighter and darker areas represent contours within the site area.)


KEY:
■ Excavated Unit
SE - Shell exposure (1995)
¤ SE - Shell exposure (1983)
LF - Lithic find spot
☐ Standing building
Rock pile
☐ Rock-lined depression
Maintained path (1995)
Overgrown path (1995)
Path (1983)
Cellar
SE 1
SE 2
Unit BT61
SE 6
Unit BO[illegible]8
SE 4
SE "C"
SE 3
LF 1
Units AL43/AL44
SE 5
Unit AV102
SE "A"
SE "B"
BREAK-IN-SLOPE
20 Metres

other near the centre. The current landowner also maintains a number of mown trails. The tractor which is used for this mowing has created some wheel ruts which in localized places have churned up the upper 10cm to 20cm of the soil.

Local environment and modern site structure

The Baird site is on the southwestern end of Cheney Island (Figure 4.1). Cheney Island is located between Ross and Whitehead Island and with them, delimits the eastern side of Grand Harbour. These islands are all connected at low tide, and less than 20 years ago people were able to walk from the mainland to Whitehead (the furthest offshore) in a single low tide. Given the rising sea level, it is quite likely that at some point in the past these islands formed a continuous arm of the mainland, with Grand Harbour a broad, fertile lagoon at its centre (see Figure 2.6 and 2.7). When this arm or peninsula was breached by the ocean is difficult to reconstruct, as substrates, orientation of the coast, local conditions and specific storm event all would have been important variables.

The local geomorphology is unusual for prehistoric site locations, in particular those with shell deposits. Only one other shell-bearing site has been recorded in a similar location in Charlotte County (see below). No other published references were found to similar sites in the Maine/Maritimes area. A transect from the low water line, running north to the tree-line at the top of the meadow, reveals the following landform features (Figure 4.3):

1). The lowest portion of the intertidal zone is a wide flat area, covered with fine, soft substrates (mud flats), and rocky ledges and outcrops. These are uniformly covered with rockweed. South of the site, this intertidal zone is contiguous with Whitehead Island.

2). The upper beach, immediately to the south of the site, is bisected by a large bedrock outcrop. On either side of this outcrop there are crescentic beaches. These upper beach portions are moderately steep (ca. 20°), and covered with pea-gravel and round cobbles.

3). At the top of the beach, immediately above the average high water line, is a gravel berm. Its beachward edge is studded with historic debris and flotsam. Its upper and landward surfaces are loosely bound with a mat of beach grasses and beach peas.

4). Behind the berm, the land falls to a low-lying wet area. To the east of the bedrock core, this area has been breached by the sea, and is now a salt marsh, covered with low bushes and sedges. West of the bedrock core, and southwest of the site, this low-lying area contains a shallow freshwater pond. This pond is fed by a series of freshwater springs as demonstrated by several historic period wells in the woods to the north of the pond which produce quantities of potable water. The land around the margins of the pond and in particular westward towards the bedrock core, are covered with fine sand and beach gravel, which indicate that the berm is periodically breached by saltwater (probably during major storm events). Binding this sand and gravel on the surface is a thick mat of sedges, beach grass, and brambles.

5). North of the pond, the land rises abruptly. In areas where the soil is thin along this break-in-slope, bedrock is visible.

6). North of the break-in-slope is the meadow in which most of the archaeological site is found. The topography of the meadow is rolling and uneven, but generally continues to slope upward away from the water. The veneer of soil on top of the bedrock is also uneven; in some places, there is no soil covering the surface of the bedrock, while in

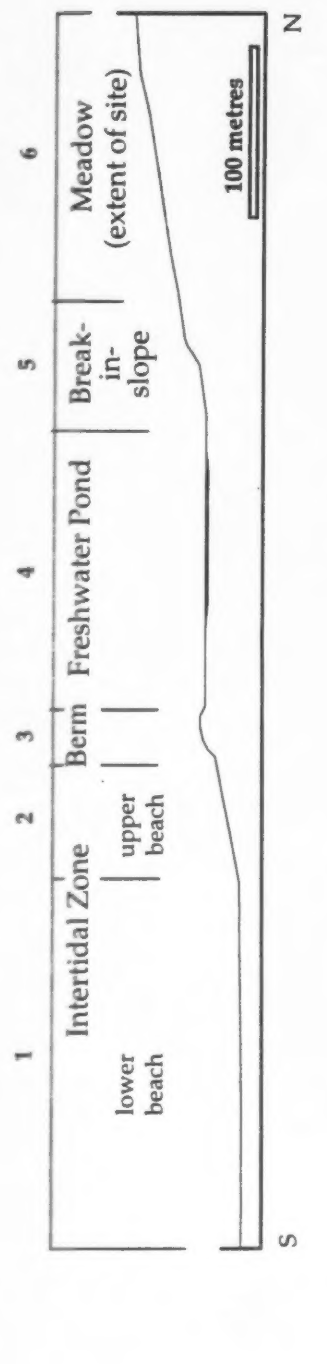


Figure 4.3: Cross-section from north to south showing the geomorphological feature to the south of BdDq3, drawn from the estimated midpoint of the site. (N.B.: linear distances are correct, but vertical distances have been exaggerated to render them discernable.)

other places, the soil appears to be more than 50 cm thick. The soil in the meadow is a dark brown sandy loam. It is covered with a mix of brambles, labrador tea, ox-eye daisies, clover and grass. In several places, coniferous trees have begun to encroach on the meadow, and in these spots, young spruce are clustered in groups of two or three. North of the meadow, the forest cover is composed mainly of spruce and alder. East of the meadow this gives way to mixed hardwoods and softwoods (tamarack, spruce, birch and apple), while to the west, as the land falls to the salt water marsh, the tree cover is composed of alders.

Survey and excavation

Before the subsurface examination was conducted, the field and the areas immediately adjacent to it were foot-surveyed and mapped. The foot-survey involved walking carefully over the surface of the site, and recording any visible archaeological evidence. This methodology resulted in the recording of one historic cellar, six exposures of shell, one lithic scatter, and four rock-piles (Figure 4.2). This evidence and the modern topographic features were amalgamated with the map produced by Black (1984). For clarity, Black's letter scheme is used for his shell exposures (i.e., A, B and C), but numbers are used to designate the 1995 shell exposures (i.e., 1 through 6). Although the gross morphological features indicated on Black's map were accurately placed, the 1983 exposures were no longer visible on the surface. Furthermore, most of the paths had been altered, which is not surprising considering that these paths are no more than well-mown grassy areas. Some of the newly recorded shell exposures (e.g., SE4, SE5, and SE6) are near those reported by Black in 1984 (Figure 4.2).

Because of the high potential of this site for further work, only a few units were excavated, using careful recording methods and controlling for provenience, as opposed to a more widespread regime of shovel-testing. Although the latter might have provided more information about the extent of the site, it was felt that it would be harder to record the exact nature and extent of disturbance resulting from such testing, which would be important information for future excavators. Instead, site mapping was a priority, with attention on accurately correlating geomorphological features with datum points, baselines and excavation units. The excavation units were selected after a 1m^2 alphanumeric grid was established for the whole site area.

To correlate the 1995 field work with Black's (1984) surface exposures, the first two units were placed close to the modern shell exposures nearest those recorded in 1983 . These 1m^2 units were designated (using the alphanumeric site grid) as AV102 (near SE5, SE "A" and SE "B") , and BT61 (near SE4 and SE "C"). The third unit, AL44 was located adjacent to the lithic find spot (LF1), as this find was different from the shell exposures (both in the presence of a prehistoric artifact. and in the lack of associated shell), and would permit as broad a sample as possible. A fourth unit was placed adjacent to a shell exposure (SE6) on the edge of the bedrock outcrop, BO48 (Figure 4.2). Because of time constraints, the final unit (AL43) was placed next to AL44, as this unit had been highly productive, and stratigraphically was relatively uncomplicated. To complement the data from these units, and to control for loss of data, some areas within units AV102 and AL44 were bulk- and column-sampled.

Preliminary assessment of finds

Because of the large size of the site, and the limited nature of the excavation, each excavation unit (with the exception of the contiguous units, AL43 and AL44) produced very different results. This indicates a high degree of lateral heterogeneity, and implies either a series of 'shingled' or dispersed components and/or spatial differentiation within single components. Thus, the four areas of excavation will be discussed individually.

Unit BT61

This unit was placed adjacent to shell exposure SE4, which was located ca. 7m north of Black's 1984 shell exposure SE "C" (Figure 4.2). The shell on the surface of Exposure 4 consisted of soft-shelled clams (*Mya arenaria*), and mussels (*Modiolus modiolus* and *Mytilus edulis*). A few sherds of (historic period) coarse red earthenware with a black lead glaze were also encountered in this exposure. Exposure SE4 was in a basin-shaped patch of disturbed soil; excavation unit BT61 was placed to the northwest of this exposure, with the southeast corner of the unit touching the exposure. The soil in the unit was black and organic, and overlay an orange-brown subsoil, over bedrock.

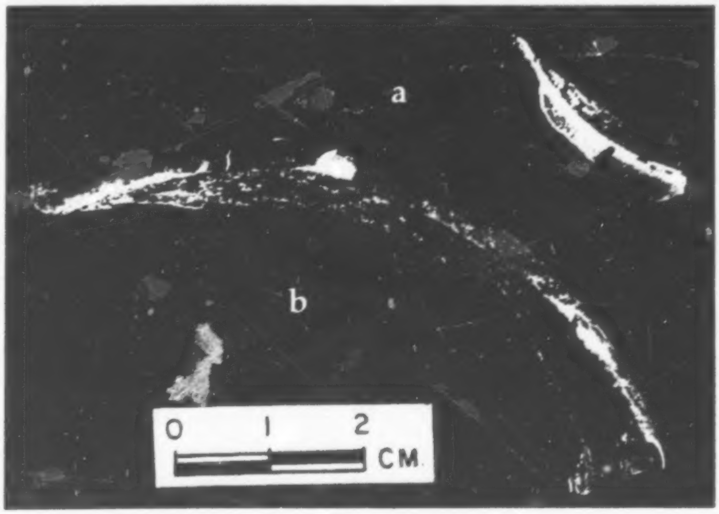
Unit BT61 produced large quantities of shell (including the above species), as well as sea urchin fragments (*Stronylocentrotus droebachiensis*) and whelks (*Bucinum undatum*). However, mixed in with these materials were fragments of a historic coarse red earthenware vessel. Although most of the ceramics were recovered from the upper 15cm of the southeast corner, the total depth of cultural material was only ca. 25cm; for the purposes of stratigraphic analysis and context, this deposit was considered to be largely disturbed. However, under the shell layers, in the northwest corner of the unit, part of a gravel lens was encountered. This lens is similar in structure to "living floors", or "gravel house floors" that have been excavated from prehistoric shell-bearing sites in the QR (Black 1992: 78; Davis 1978; Sanger 1987: 23) and the CCM (Bourque 1995; Belcher 1989). Although no lithic material was recovered from this unit, the faunal preservation was good, resulting in the retrieval of a portion of a beaver incisor (Plate 4.2a), and quantities of animal bone including sea mammal and bird bones and several large fish vertebrae. The bird assemblage includes the coracoid of a large bird (probably a great auk, (Black 1996: pers. comm.)) bearing stone tool cut marks. Although some charcoal was encountered, the unit was too disturbed to warrant a radiocarbon assay.

Unit AV102

Unit AV102 was located in the eastern edge of the meadow, adjacent to shell exposure SE5 (Figure 4.2). This exposure is ca. 7.5m northeast of Black's shell exposure SE "A", and almost 13m north of his shell exposure SE "B". Exposure SE5 has been created by a large granite rock that breaks the surface exposing the shell (Plate 4.3). The excavation of unit AV102 showed that the boulder is a very large erratic (not local bedrock); only the tip was exposed, even when 40cm of soil was removed from its south face. The boulder was grounds for cautious optimism about the stratigraphic integrity of the material around it, as its presence would have precluded disturbance of the deposit by ploughing or surface mixing. This optimism was well founded, as AV102 contained a number of discrete shell and gravel layers (Figure 4.4).

Unit AV102 produced several artifacts, but unfortunately none diagnostic of particular time periods. An edge-flaked chopping implement was recovered near the surface of the shell layer (Layer 3; Plate 4.4). This artifact is a smooth,

Plate 4.2: *Beaver incisors recovered from Units BO48 and BT61 of the Baird site (photo credit: David Keenlyside).*



subrectangular cobble (weighing 233.0 gm), which has been flaked along one of its the narrow ends to produce a sinuous, wide-angled bit. Two similar artifacts were recovered from Kidder Point in Maine by Spiess and Hedden (1983: 77), who interpreted them as pounding implements:

> *The edge produced is sinuous, not sharp. It would have been useless for working anything harder than bark or charred wood. Perhaps the edge was not meant to cut, but to shred or pound vegetable matter.*

A perfectly smooth baseball-sized rock was also recovered from this unit. Because only slight battering is visible, a functional explanation for the object is difficult, but the size and shape suggests that it may have been a hammerstone. A piece of yellow-ochre was recovered within the clam shell layer (Layer 3). It is round, with an oval cross-section, and has a soft, crumbly texture; one surface has a small dimple in it. This specimen appears to be an ochre paint rock, with the dimple suggestive of use. No published references to similar objects from New Brunswick or Maine sites have been encountered, although such objects are well known from the wider prehistoric literature.

An assemblage of faunal material was also recovered, including sea mammal and bird bone. Because of the intact nature of this unit, and the lack of datable material from elsewhere on the site, a sample of clam shell (*Mya arenaria*) from a column taken from the north wall of this unit was sent for radiocarbon dating (Figure 4.4). The sample (Beta-88603) produced a measured C14 age of 1600±80 bp, or a conventional C14 age of 2030±90 bp. Further calibration of this result was necessary, as this sample was produced from shell, rather than wood charcoal. Dr. David

Plate 4.3: *Unit AV102 of the Baird site, showing the northern profile and the midden stratigraphy.*

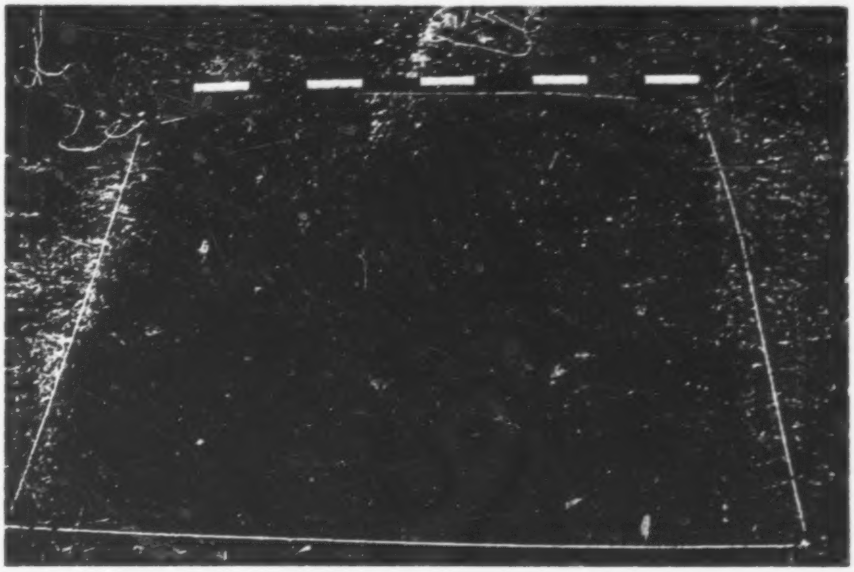
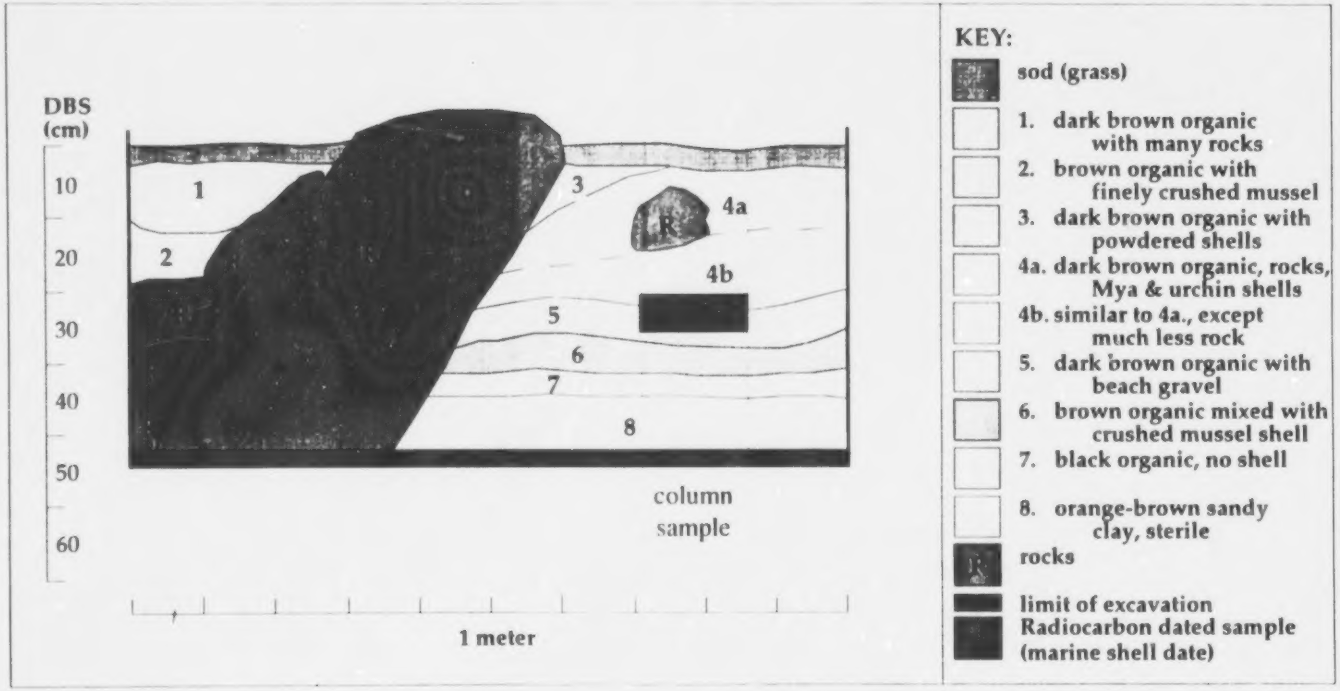


Figure 4.4: A drawing of the north profile of Unit AV102


DBS (cm)
10
20
30
40
50
60
1
2
3
4a
4b
5
6
7
8
R
column sample
1 meter
KEY:
sod (grass)
1. dark brown organic with many rocks
2. brown organic with finely crushed mussel
3. dark brown organic with powdered shells
4a. dark brown organic, rocks, Mya & urchin shells
4b. similar to 4a., except much less rock
5. dark brown organic with beach gravel
6. brown organic mixed with crushed mussel shell
7. black organic, no shell
8. orange-brown sandy clay, sterile
rocks
limit of excavation
Radiocarbon dated sample (marine shell date)

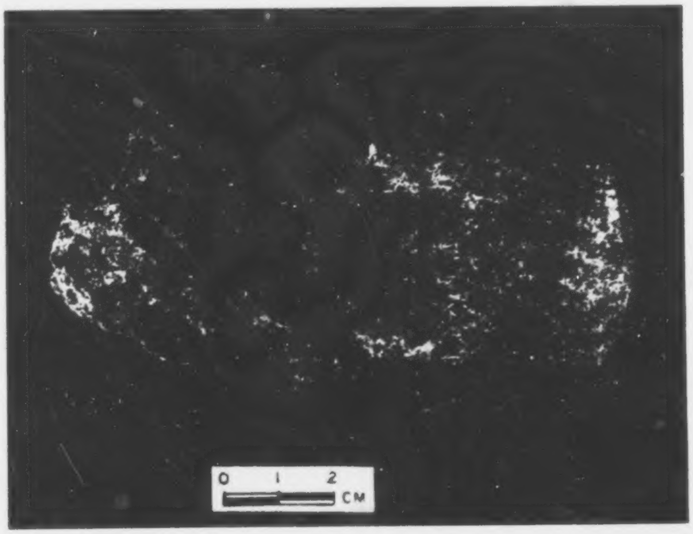
Black calibrated and plotted the results, using a radiocarbon calibration program (Calib3.0.3, produced by the University of Washington Quaternary Isotope Lab). He used Beta Analytic's conventional age and sigma (2030±90), applied the recommended standard lab offset of 1.00, and a delta R of -50±50 years (calculated from an historic period shell deposit on the Bliss Islands). He then used a calibration curve derived from marine coral samples, and calculated and plotted the results in 1 and 2 sigma ranges. Based on the assumption that the carbon in the sample is 100% marine-derived, the mean age is AD 320, or 1630 cal BP. The range, at 2 standard deviations, is AD 80 to 550, or 1860 to 1400 BP.

Units AL43 and AL44

Unit AL44 was placed adjacent to a path where the tires of the tractor had sunken into and disturbed the soft soil, exposing a single fine-grained light grey volcanic flake. No shell was visible in the disturbed soil. This find spot is ca. 20m southwest of the modern red fishing camp, and 27m south of BO48, below the southern edge of the break-in-slope of the meadow, and along eastern edge of the central bedrock outcrop (Figure 4.2). The resulting lithic assemblage was interesting enough that the adjacent unit, AL43 was opened.

The soil in AL43 and AL44 was a loose, light brown sand, with occasional rocks and pebbles. The surface was bound together by a thick mat of sedges. Although occasional patches of darker sand were found, these were usually thin and localized (less than 5cm thick and 30cm wide); generally the soil was remarkably homogenous. In an area ca. 25cm thick, commencing within 10cm of the sod, and continuing to 5cm above subsoil, quantities of lithic debitage, a biface base, a utilized "microblade", a retouched flake and several utilized flakes were recovered (Table

Plate 4.4: *A chopper from Unit AV102 of the Baird site made of dark volcanic (GM33) (Photo credit: David Keenlyside).*



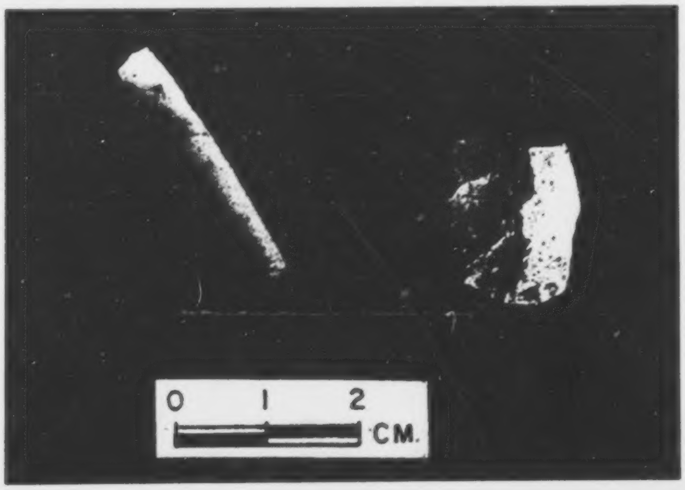
4.1; Plate 4.5).

The biface fragment is unstemmed, with a concave base (Plate 4.5b) and is made of an extremely weathered white volcanic. Small bifaces are generally associated with LMW components, although this specimen falls below the expected size range even for late components.

The "microblade" is triangular in cross-section, and is manufactured from a white translucent hornfels (Plate 4.5a; see Chapter 5). The distal end has been utilized along one edge. The morphology of the artifact is reminiscent of a technology normally associated with eastern subarctic and arctic assemblages. The association between northern groups and microblade technology is so strong that it is considered a diagnostic trait of northern assemblages. Consequently, the term "microblade" is applied to this artifact with a degree of caution, as there was no other evidence of microblade technology such as microblade cores recovered from the Baird site or the GMA. Indeed, the shape may be the fortuitous result of biface core reduction. While it is rarely reported, artifacts that suggest both northern linkages (Loring 1988) and microblade technology (J. B. Petersen 1996: pers. comm.) have a scattered distribution in the Northeast, where they may be affiliated LMW components. Greater recognition of this pattern may be impeded by a lack of both identification and reporting.

The flaked stone from units AL43 and AL44 (consisting of debitage, utilized flakes and retouched flakes) was assessed according to stages of lithic reduction (primary, secondary and tertiary). Most of the flakes (39% (n=82)) were the result of secondary reduction (biface thinning flakes), while primary reduction (decortication and core reduction flakes), accounted for 19% (n=41) of the flakes,and tertiary reduction (pressure and retouch flakes), accounted for 10% (n=23) of the

Plate 4.5: *Lithic artifacts from Units AL43 and AL44 of the Baird site; (a) is a utilized microblade of white hornfels (GM51; note arrow pointing to area of use); (b) is a biface base of bleached volcanic (GM29) (photo credit: David Keenlyside).*



flakes. A significant number of the flakes (31% (n=65)) were unidentified, largely because of shatter and breakage (only 64% of specimens were complete).

The only other macroscopically visible archaeological material encountered from these units were mussel periostricha, which were found in the upper 20cm of these units. Mussel periostricha are often preserved in acidic soils due to the inhibition of soil microbes, while the acids destroy the mineral portions of the shellfish. Unfortunately no datable materials, in the form of charcoal, shell, or diagnostic artifacts, were recovered from these units.

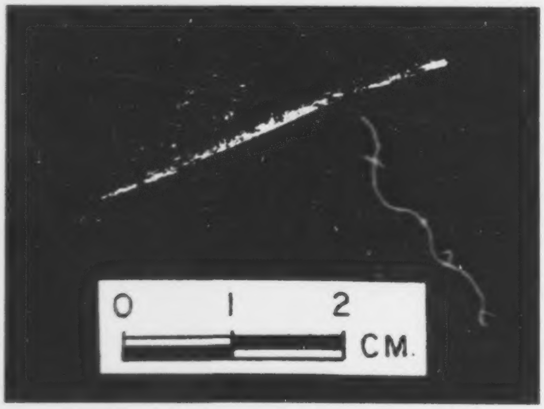
Unit B048

This $1m^2$ unit was placed adjacent to shell exposure SE6, which was 15m west of shell exposure SE4, on the upper part of the slope of the bedrock core (Figure 4.2). This shell exposure produced primarily clam fragments (*Mya arenaria*). Of all the units excavated, BO48 showed the most evidence of

Table 4.1: *Artifacts recovered from AL43 and AL44 (combined).*

Artifact Type	No. of pieces	Weight (gm)
Flakes (debitage)	190	153.75
Utilized flakes	19	62.30
Retouched flakes	2	3.60
Bifaces	1	1.40
Microblades	1	0.80
Cores	0	0.00
Total Artifacts	213	221.85

Plate 4.6: *A bone point tip recovered from Unit BO48 of the Baird site (photo credit: David Keenlyside).*



disturbance. The soil is thin (total depth ca. 25cm) on the slope of the bedrock core, which does not allow for a buffer between the prehistoric material and historic activity. The unit produced quantities of soft-shelled clams (*Mya arenaria*), mussels (*Modiolus modiolus* and *Mytilus edulis*), and a well preserved bone assemblage, including artifacts (the tip of a bone harpoon, Plate 4.6 and a beaver incisor, Plate 4.2b) and food items (sea-mammal and bird bone). A few pieces of lithic debitage were also recovered, including several large utilized flakes (Table 4.2). The size and material of these flakes is quite different from those recovered from AL44 and AL43, suggesting a chronological or functional differences.

The flaked stone from BO48 was classified in a manner similar to that from Units AL43 and AL44. Primary reduction (decortication and core reduction flakes) accounted for most of the identifiable flakes (33% of the total (N=8)), while secondary reduction (biface thinning flakes) accounted for 22% of the total flakes (N=6), and tertiary reduction (pressure and retouch flakes) accounted for 15% (N=4). As was the case with Units AL43 and AL44, high flake breakage rates (only 74% of specimens complete) resulted in a high quantity of unidentifiable flakes (33% of the flakes (N=9)).

This unit also produced large quantities of historic ceramics, including coarse red earthenware vessel sherds, brick fragments, and a few small sherds of white refined earthenware (a type known as "creamware"). These wares are typical of a late 18th century assemblage (C. R. Blair 1995: pers. comm.). Unfortunately, this historic material was found in contact with, and in some cases, stratigraphically beneath, some of the prehistoric material. This suggests a mixture of the deposit (e.g., from ploughing) or a secondary context (e.g., due to slumpage or wholesale excavation or shifting of deposits).

Surface features

A number of archaeological features were examined that were visible from the surface. These surface features were of two kinds: rock-lined depressions and rock piles. One rock-lined depression was encountered north of the site on the upper surface of the bedrock core near the tree-line. It is ca. 3.5m by 3.5m in size, and ca. 1m deep. It is roughly oriented to the southeast. The feature is lined with large (15 to 30cm in diameter) cobbles, and there is a scatter of similar rocks to the south and east. The southwestern wall of the feature is built up slightly above the surface of the

***Table 4.2:** Lithic artifacts recovered from BO48.*

Artifact Type	No. of pieces	Weight (gm)
Flakes (debitage)	24	53.2
Utilized flakes	3	26.0
Retouched flakes	0	0.0
Core, bifacial	1	15.1
Total Artifacts	28	94.3

ground. This structure is similar to historic period cellars in the region, although it was too dilapidated to determine what type of building might have stood on it.

The four rock piles recorded are pyramidal and generally asymmetrical, less than 1m high, and 2 to 3m in diameter. In most cases, there are brambles and small shrubs obscuring their bases. Composed of rocks ranging in size from boulders (25 to 30cm in diameter) to small baseball-sized cobbles, they occurred along the top of the break-in-slope between the meadow and the freshwater pond. A close examination of one of rock-piles revealed that the cobbles were roughly uniform in shape and size to a depth of at least 60cm. Further examination was not possible without completely disassembling the pile. Associated with these rock piles were quantities of recent historic debris, such as plywood, insulated electrical wire, and corroded metal pipe. This association may have been incidental, as a result of the recent practice of discarding inorganic waste in areas which have low traffic potential, as is often observed in abandoned cellars and depressions. The most likely explanation for the piles themselves, however, is the cultivation of the meadow. In regions with rocky substrates it is not uncommon for rows or piles of rocks ploughed or hand sorted out of fields to attain sizable proportions.

Dating and chronology

The spatial and chronological analysis of the Baird site is complicated by its large size, and the small sampling size. Because of this, correlating the artifacts, features and stratigraphic components between units is difficult. However, it is clear that a series of historic period and prehistoric period activities were carried out in and around the meadow. Based on the current data, the historic period activity can be broken down into three episodes:

1) the use of the cellar at the north of the site (likely in the late 18th century)
2) Baird's visit and possible exploration (either deposits were visible as a result of contemporary activity, or Baird made them visible by his own activity).
3) during the recent/modern period (construction and use of the modern camps and outhouse, and the mowing of paths)

The cellar seems to be directly related to the disturbances visible within the some of the units with prehistoric material (Table 4.3).

Table 4.3: *The relationship between distance of excavation units from the cellar and the level of stratigraphic disturbance, as indicated by the presence or absence of historic artifacts, their vertical relationship to prehistoric material, and the amount of discernible stratigraphy.*

Unit	*Distance (m and direction)*	*Level of disturbance*
Unit BO48	20 (SSW)	very high
Unit BT61	25 (SW)	high
Unit AL44/AL43	46 (S)	low
Unit AV102	74 (SW)	low

The prehistoric period is far more difficult to address. The inability to locate contiguous layers, or to correlate finds between units has hampered this analysis considerably. However, the material evidence suggests the presence of a Middle Maritime Woodland component (as indicated by the radiocarbon date from AV102), and possibly a Late Maritime Woodland component (as indicated by the artifacts and lithic materials from units AL43 and AL44).

NEWTON'S POINT (BeDq-11)

The Newton's Point site (BeDq11) is located at the tip of a point, on the northern edge of Grand Harbour (Figure 4.5). Although it was explored in 1869 by S. F. Baird, it was not recorded as an extant archaeological site until April 1995. This point of land is now known as Phillip's Point. Wendy Dathan of the Grand Manan Museum correctly identified it as Baird's "Newton's Point", based on her knowledge of local history and the fact that it was owned by Phillip Newton during the 19th century. In the recording process, the site name "Newton's Point" was retained to maintain consistency in the archaeological literature, and in recognition of Baird's initial identification of the site. The site consists of the shoreward margin of a large, cleared field. Where the field is truncated by the action of the ocean there is a shallow eroding bank of dark brown loamy sand which contains several small patches of clam shell. A roughly flaked quartzite pebble was recovered within one of these during the first surface examination of the site (Plate 4.7), which supported its identification as a prehistoric archaeological site.

Local Environment and Modern Site Structure

As its name indicates, Newton's Point is on a wide point of land extending southward into Grand Harbour, with the cultural deposits eroding onto the southeast beach (Figure 4.5).

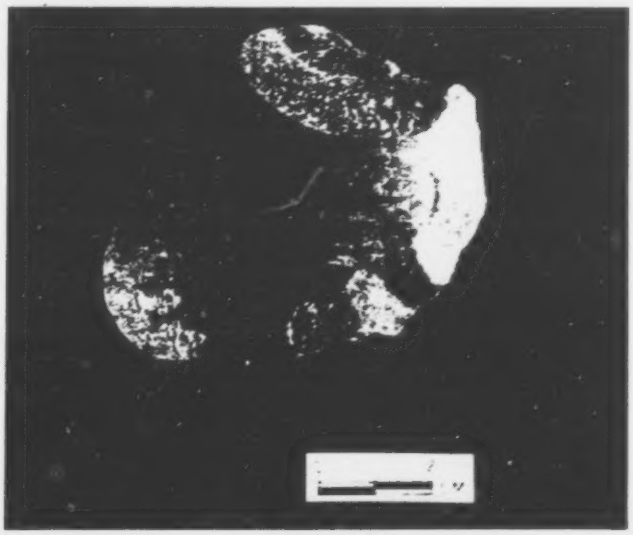
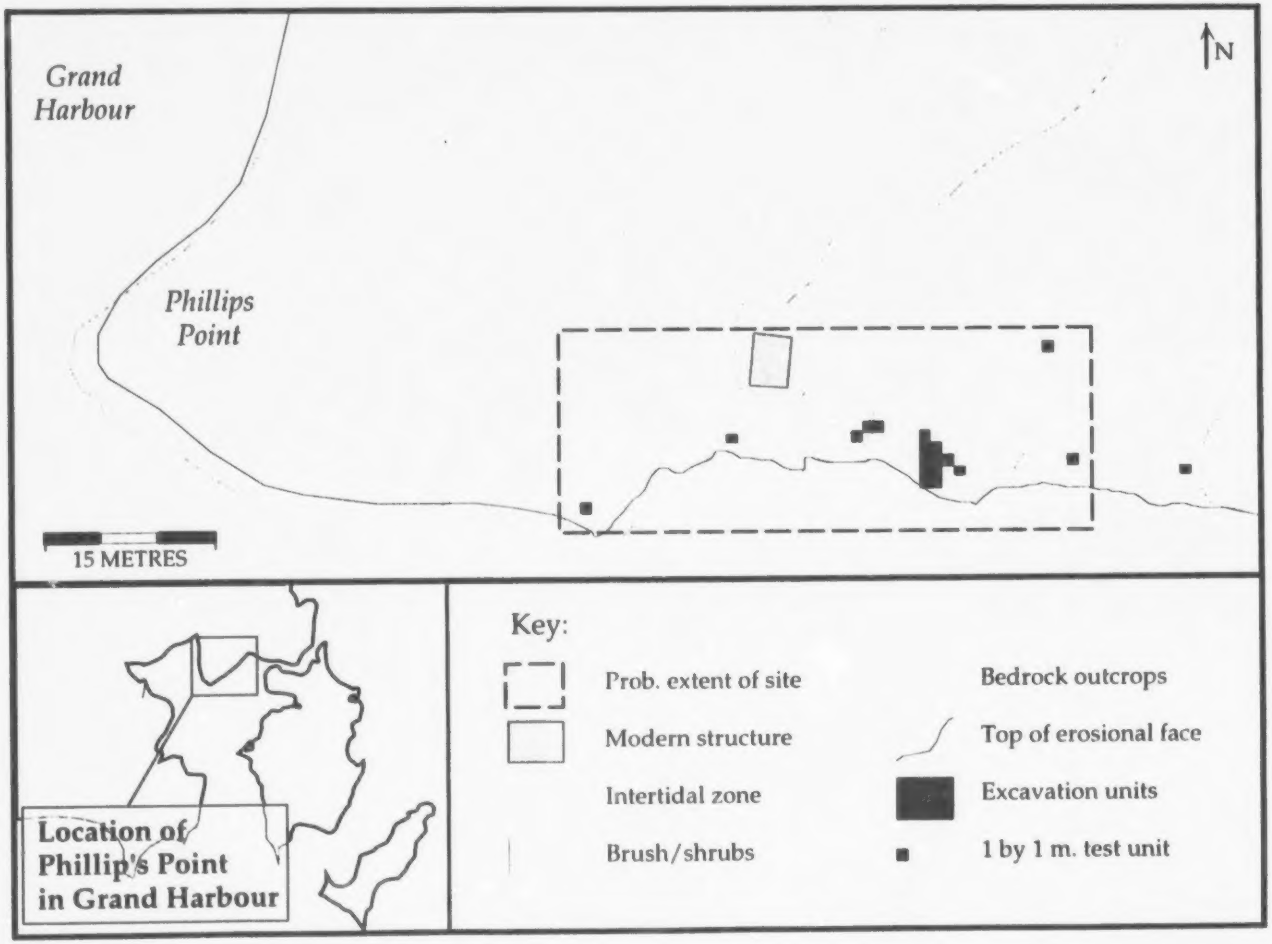


Plate 4.7: *A core tool/chopper from the Newton's Point site, made of coarse-grained brown quartzite (photo credit: David Keenlyside).*

Figure 4.5: Phillip's Point in Grand Harbour showing the probable extent of the Newton's Point site.

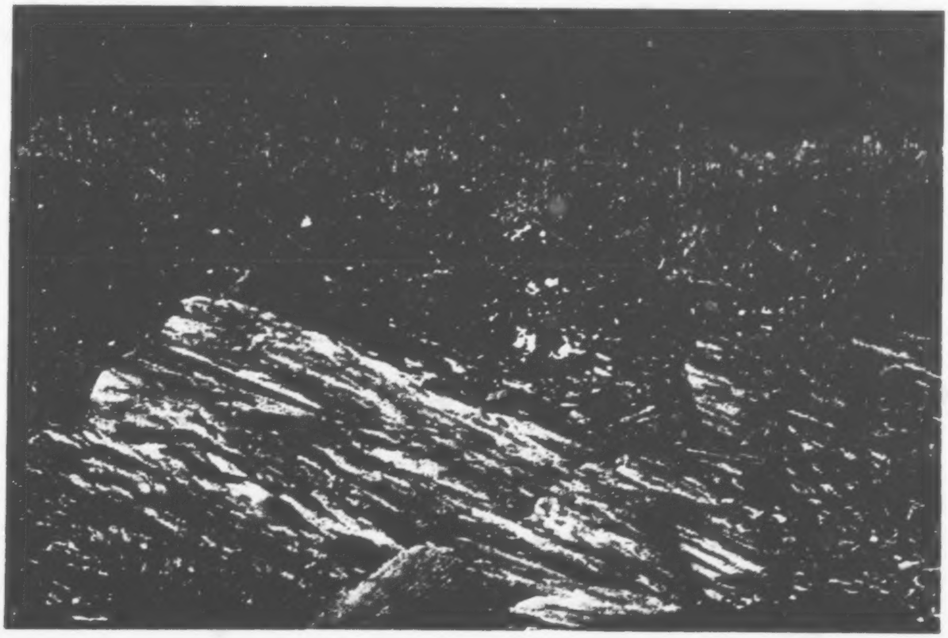

N
Grand Harbour
Phillips Point
15 METRES
Location of Phillip's Point in Grand Harbour
Key:
Prob. extent of site
Modern structure
Intertidal zone
Brush/shrubs
Bedrock outcrops
Top of erosional face
Excavation units
1 by 1 m. test unit

The beach in front of the site has a loose shingled surface along its steeper, upper portion, with substantial mud flats and clam beds extending south and east from it. The intertidal zone, as measured from the top of the erosional scarp to the low tide line has less than a 3.5° gradient.

Grand Harbour is a large basin-shaped embayment, with mud flats around its margins. Several relatively large freshwater streams feed into the harbour from the west and south. To the east, Grand Harbour is delimited by a chain of islands — Ross, Cheney and Whitehead (from north to south). All of these islands are connected to each other to some extent at low tide, and Ross Island is connected to the mainland by a sizable thoroughfare at all but high tide. The Thoroughfare has been an intertidal road for over 100 years, as indicated by Baird's journal (Appendix A). Grand Harbour is well sheltered and rich in resources. It attracts many shorebirds and waterfowl, including a flock of up to 40,000 Brant geese (*Branta branta*) every spring. Several times during the fieldwork small whales and porpoises were observed within the harbour, and ledges along the eastern margin of the harbour are well-used 'haul-outs' for harbour and grey seals (*Phoca vitulina* and *Halichoerus grypus*).

There are several small bedrock outcrops exposed or loosely covered with brambles and weeds on the surface of Phillip's Point, and several of these extend into the intertidal zone immediately adjacent to the site. The bedrock is angular and shatters into tabular slabs and fragments. Because of the bedrock morphology, the beach shingle is irregularly sized; wave action has size-sorted it into a fringe of larger chunks near the high water

Plate 4.8: *A shell exposure in the erosional scarp of the Newton's Point site.*



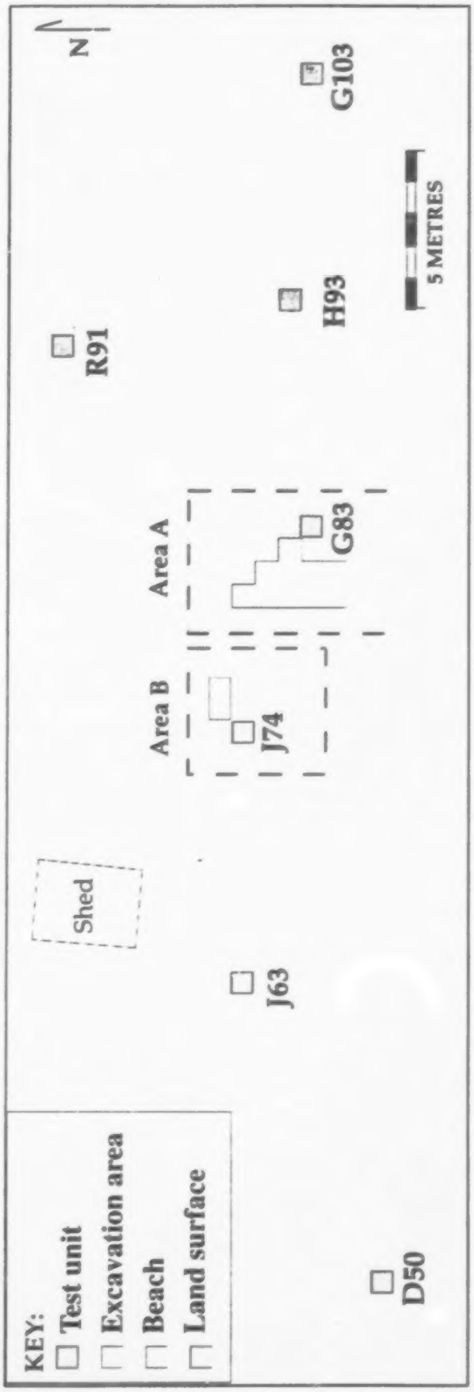


Figure 4.6: The Newton's Point site (BeDq-11) showing the placement and designation of test units.

line, with patches of pea gravel and sand further down the beach. Phillip's Point itself gradually rises from the beach to a small knoll of exposed bedrock ca. 25m from the beach. From this knoll the land rises more gradually to the tree-line, which is 200 or 300m from the beach; all of the intervening land is covered by grass (which is regularly mowed to lawn-like conditions), with large areas of shrubs and brambles concentrated in the lower (beachward) portions. Toward the point, ca. 100m east and north of the site, there are several marshy areas, where wetland plants such a blue flag are growing. The landowner indicated that a freshwater spring feeds this section of the field, and that in the last 100 years, a small well was located there to access this water.

The upper portions of the field are largely grass covered, and were plowed in historic times. None of the local people remembered the lower part of the point, near the site, being plowed; some people indicated that salt spray would inhibit garden growth. Adjacent to the site, ca. 6m north of the erosional face, and 7m northwest of Test Area B, there is a small shed. This shed has footings which were dug into the ground. Around the edges of the shed and immediately adjacent to it are exposed patches of ground which produced some lithic debitage (4 flakes). The landowner indicated that a small grassy hump immediately adjacent to the shed (less than 1.5m to the east) was created by the material that was excavated for the footings. It was simply left as a small pile of dirt, and allowed to grass over.

The site lies within sandy gravelly soil, which overlays the bedrock. Where this matrix meets the beach, it forms a steep erosional face, 30 to 120cm in height. Within this erosional face, there are periodic patches of soft-shelled clam (*Mya arenaria*), which are usually no more than 2 or 3cm thick and less than 1m wide (Plate 4.8). No other species of shellfish were encountered in these exposures. Initially, the assumption was made that these shell patches were likely associated with prehistoric cultural material.

Phillip's Point (and with, it the Newton's Point site) is actively eroding. It is exposed to the south and is not protected by any substantial bedrock outcrops. Furthermore, it is directly behind a low gradient beach. All of these factors combine to make the complete destruction of the site imminent.

Fieldwork and excavations

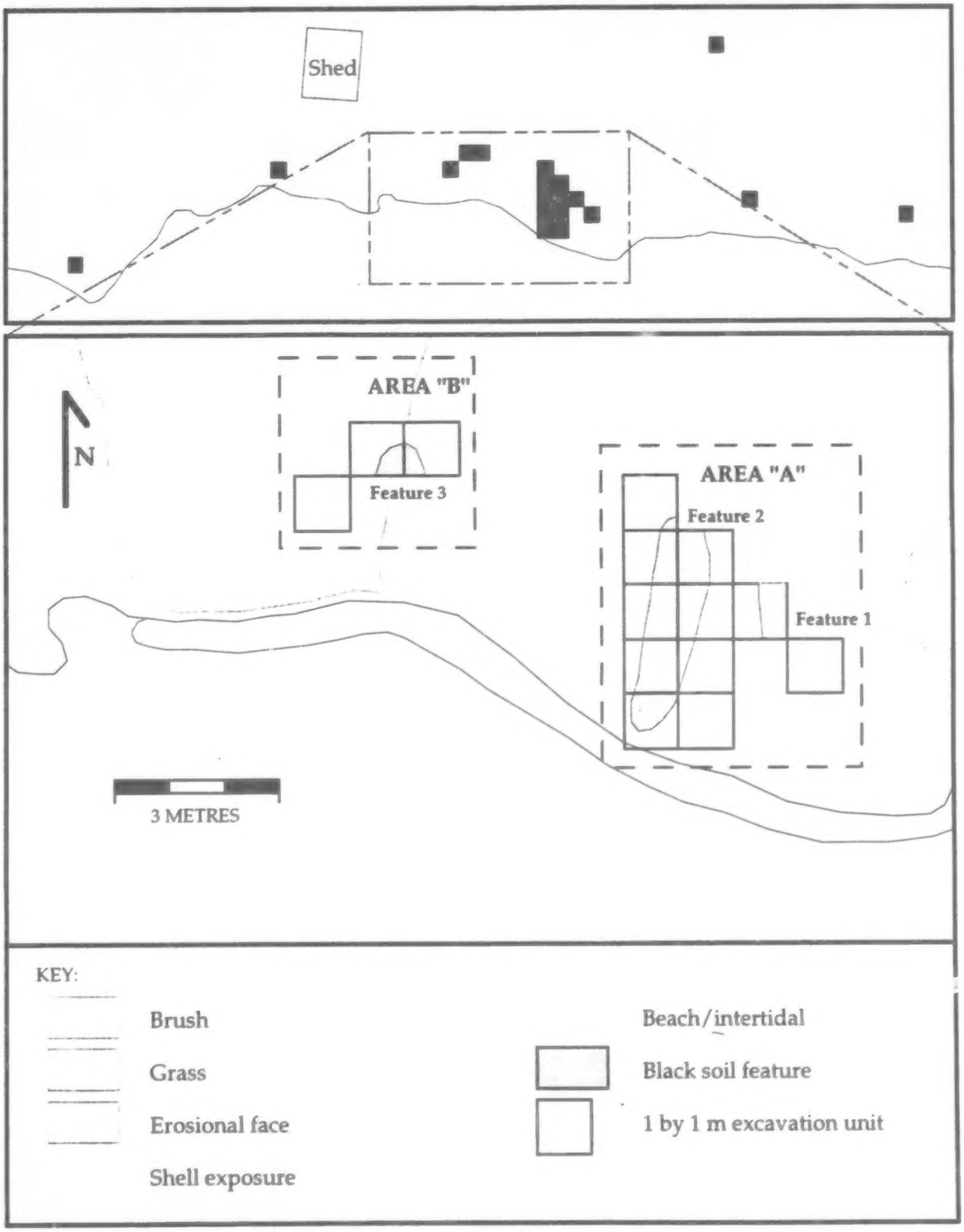
Over a period of 6 weeks in the summer of 1995, 19 $1m^2$ units were excavated at the Newton's Point site. The initial 6 units were placed at 10m intervals adjacent to, but 1 to 2m from, the erosional face. A seventh unit was placed 10m from the erosional face, at roughly the midpoint of the site, as estimated by the occurrence of the shell patches along the eroding bank. These 7 units comprised the preliminary testing of the site (Figure 4.6). Although some of these initial units produced prehistoric material 20 to 40cm below the surface (Table 4.4), artifact densities were low (less than 10 artifacts/m^2), and no features were encountered.

Only 2 of the units (Units H93 and G103, located at the eastern extremity of the site area) were completely culturally sterile. Little historic debris was encountered, and the few pieces that were found (fragments of glass, a glass marble, a few pieces of metal), were concentrated in the sod or immediately below it. The shell visible in the erosional profile did

***Table 4.4:** Artifacts recovered during the preliminary testing of BeDq-11.*

Provenience Unit	Artifact	No. specimens
Surface	*Chopper/core*	1
Surface	*Lithic debitage*	14
D50	*Retouched flake*	1
D50	*Lithic debitage*	4
J63	*Endscraper*	1
J63	*Abrader*	1
J63	*Anvil stone*	1
J63	*Retouched flakes*	3
J63	*Lithic debitage*	2
J74	*Biface tip*	1
J74	*Lithic debitage*	11
G83	*Groundstone tool*	1
G83	*Lithic debitage*	10
G83	*Retouched flake*	1
R91	*Biface fragment*	1
R91	*Debitage*	1

Figure 4.7: *Newton's Point, showing features and the extent of Areas "A" and "B".*


Shed
N
AREA "B"
Feature 3
AREA "A"
Feature 2
Feature 1
3 METRES
KEY:
Brush
Grass
Erosional face
Shell exposure
Beach/intertidal
Black soil feature
1 by 1 m excavation unit

not persist inward into the cultural layers, although a thin layer of shell was found under the sod in most units. The dispersed pattern and low density of finds encountered during this initial testing suggested that most of the prehistoric component of the site had been eroded away.

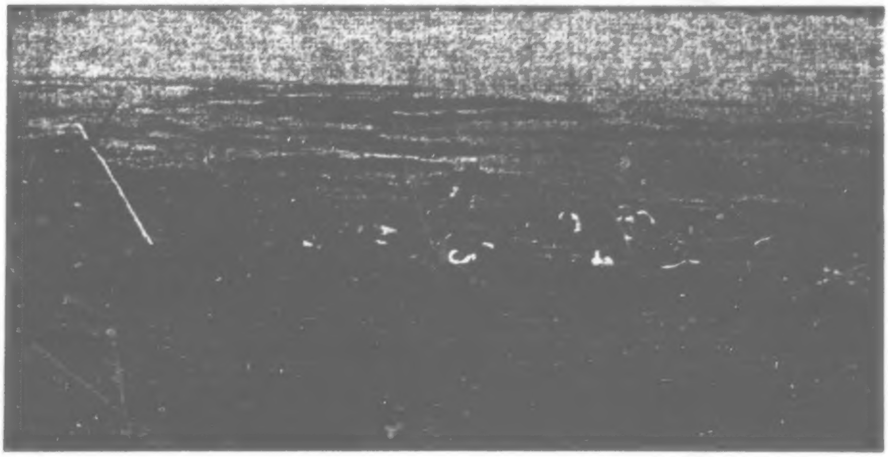
However, a final unit was placed 2m west of G83, the unit that had produced the highest quantities of debitage and artifacts. Within this $1m^2$ unit, 100 pieces of lithic debitage and 7 biface fragments were recovered. The unit also contained part of a basin-shaped feature consisting of darker, organic soil mixed with flecks of charcoal. Based on this significantly higher density of artifacts, an additional 9 $1m^2$ contiguous units were excavated; this area was then designated Test Area A; 4m to the west of Test Area A, several more units were excavated and designated Test Area B. At the end of the 1995 excavations at Newton's Point, 11 $1m^2$ units from Test Area A and 3 $1m^2$ units from Test Area B had been excavated (Figure 4.7, Plate 4.9).

Preliminary Assessment of Finds

Stratigraphy and features

The structure of the site is relatively simple. The units are covered with either a thick grass sod, or a thin mix of grass and brambles. Immediately under the sods, often bound into the sods by roots and rootlets are soft-shelled clam (*Mya arenaria*) fragments. In some places this clam layer consisted of 10 to 20 fragments of shell scattered about, but in others, it was a visible layer containing hundreds of shell fragments and chondrophores. The highest concentrations of clams were found in Test Area A, in the units closest to the eroding face (Figure 4.8). In some units, in particular those without well developed sods, this shell layer contains a large proportion of gravel, and numerous large, angular bedrock fragments. The sods and shell layer were 5 to 20cm thick and were designated Layer 1 (Figure 4.9). All of the historic material was recovered from Layer 1, except a single wooden fence post, which was embedded in the

Plate 4.9: *A view of the excavation of the Newton's Point site, taken from a knoll at the northern edge of the site, looking south towards Grand Harbour.*



southern end of Test Area A to a depth of 30 cm (the soil around the fence post is relatively undisturbed, suggesting it was pounded into place rather than augured or excavated and backfilled). Under Layer 1, a layer of brown peaty-loamy sand was encountered. This layer is 10 to 20cm thick, and was designated Layer 2. Layer 2 is culturally sterile, and caps the layer which contains the prehistoric archaeological material (Layer 3). The matrix of Layer 3 is similar to that of Layer 2, but has a higher gravel content. This gravel causes the layer to have a looser, more friable texture; the surface of Layer 3 is easily identified, as the peaty sand of Layer 2 tends to lift up in chunks immediately above the interface, as opposed to coming up gradually in thin scrapes. Another characteristic of Layer 3 is the inclusion of quantities of lithic debitage. Layer 3 also contains cultural features. As these exceeded the boundaries of the $1m^2$ unit, and were differentiated by changes in soil colour and consistency, they were designated Layer 3a. Generally, the features are similar but darker and higher in charcoal content than the non-feature portions of Layer 3. Layer 3 is immediately above the subsoil (Layer 4), which ranges from a dull orange-brown to a bright orange in colour. No cultural material was found in the subsoil, even when it was excavated to bedrock. Portions of all units were excavated to bedrock or well into the subsoil, to eliminate the possibility of earlier buried archaeological layers.

Figure 4.8: Distribution of Mya arenaria *chondrophores (left valves) by number and weight, Newton's Point, Area "A" and "B".*

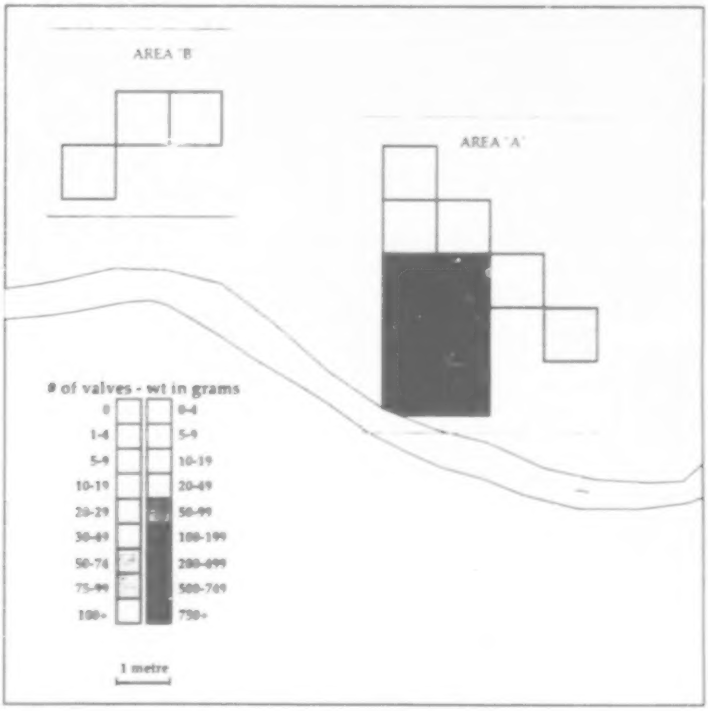
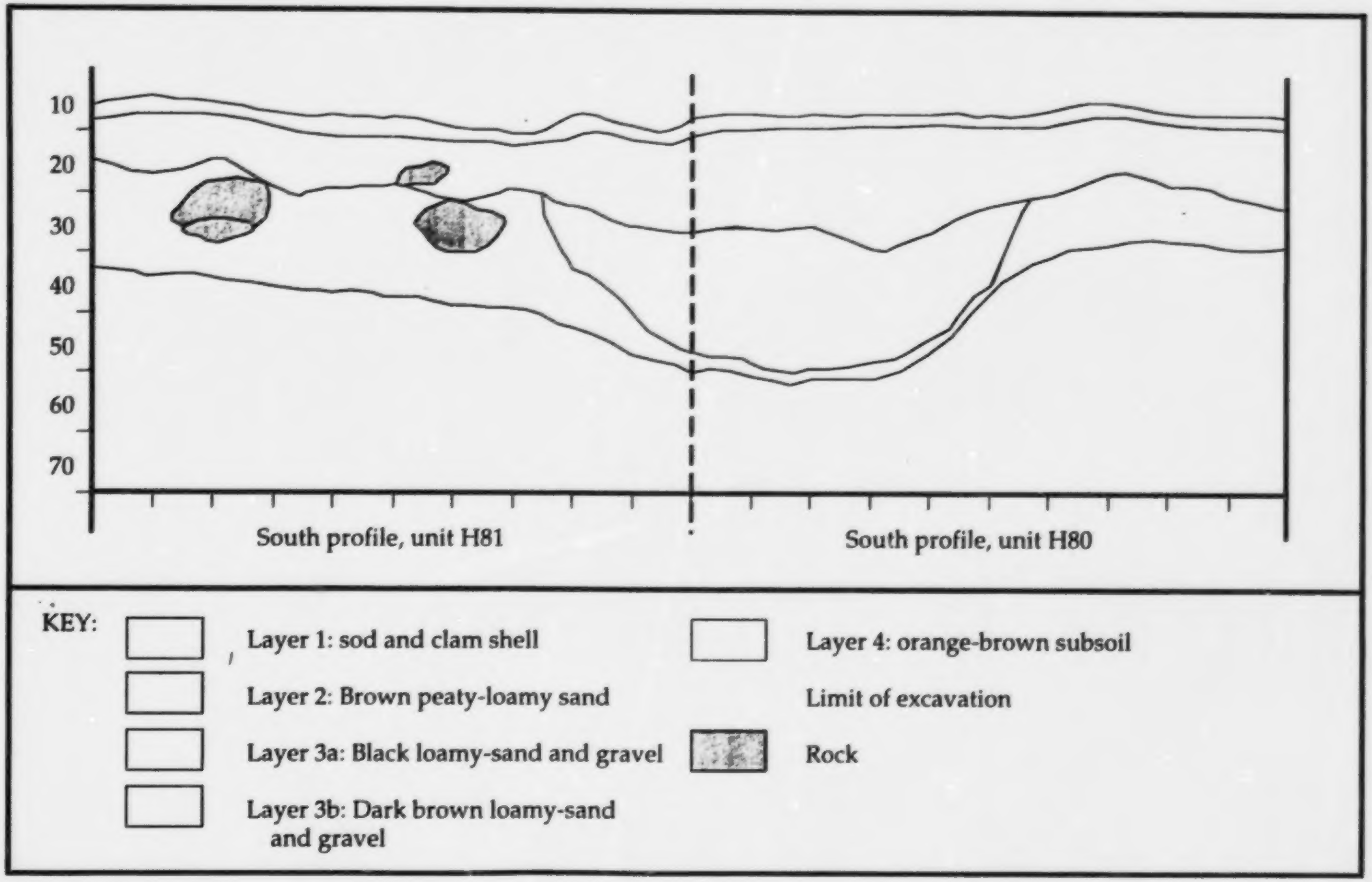


Figure 4.9: *Profile of the southern walls of Units H80 and H81, showing sectional view of Feature 2.*


10
20
30
40
50
60
70
South profile, unit H81
South profile, unit H80
KEY:
Layer 1: sod and clam shell
Layer 2: Brown peaty-loamy sand
Layer 3a: Black loamy-sand and gravel
Layer 3b: Dark brown loamy-sand and gravel
Layer 4: orange-brown subsoil
Limit of excavation
Rock

The stratigraphy of the site indicates that significant portions of it (including Areas A and B) are relatively undisturbed. Historic activity has occurred over all of the site, but seems to have been localized and mostly of low impact. However, the construction of the small shed to the north of the site would have entailed significant subsurface disturbance. There was no evidence of ploughing, suggesting that the lower part of the field, where the site is located, has not been ploughed. The frequency of relatively large (greater than 20cm in diameter) bedrock fragments just under the sod, and the lack of admixture of historic and prehistoric period artifacts, support this contention. The presence of the wooden post fragment suggests that the field may have been used at one time as pasturage, an activity with relatively low impact on subsurface remains. Furthermore, the presence of a culturally sterile layer (Layer 2) over the prehistoric cultural deposits (Layer 3) would have acted as a buffer against these sorts of low impact historic activities.

The Newton's Point site produced three shallow features. The first feature encountered, designated Feature 1, consisted of a shallow (30cm deep) basin-shaped depression. The feature was distinguishable from the non-feature site matrix by its darker (dark brown to black), more organic soil, with slightly less gravel, and occasional small (less than 0.5cm) chunks of charcoal. There did not appear to be any change in the concentration of artifacts between the feature matrix and the adjacent soil. Only one 1m^2 unit was excavated that transected this feature, so the general shape and function is uncertain. The structure and matrix of Feature 1, is however, similar to that of Feature 2.

Feature 2 was also shallow (30 to 35cm deep) and basin-shaped with a slightly flattened bottom, and was composed of darker, organic soil, similar to Feature 1 (Figure 4.9). At the base of the feature were small patches of light grey to white sand, the result of leaching or burning. Nine 1m^2 units were placed around Feature 2, resulting in it being almost completely excavated. This feature was oval shaped, with a maximum width of 1.2m and a maximum length of 3.8m (Figure 4.10). Its long axis was oriented roughly north-south. Generally, there was only a slight difference between the number of artifacts found within Feature 2 and the artifacts found in Area A, but outside Feature 2 (see note below Table 4.5). Many of the artifacts that were found in the soil adjacent to Feature 2 were concentrated at the edge of the feature and on the interface between the feature and the non-feature matrix. However, formal tools within Feature 2 appear to be slightly under-represented in comparison to formal tools from outside Feature 2 (Table 4.5).

Although there were no single large concentrations of charcoal, there were numerous small concentrations, containing chunks of charcoal up to 2cm in size, but more usually less than 0.5cm in size. One of the larger concentrations was collected for radiocarbon dating, and sent through the Canadian Museum of Civilization to Beta Analytic for dating. This charcoal sample (NMC-1480/Beta-88724) returned a date of 1090±40 bp. Several clusters of heat shattered cobbles or rock fragments (fire-cracked rocks) were recovered from the lower levels of this feature, and all of these were recovered from the southern end of the feature. These rocks may have been boiling stones (cobbles that were heated, then placed in containers with the purpose of heating the contents), or rocks incidentally or intentionally incorporated into a fire.

Feature 3, located in Test Area B, 3m west of Test Area A, was quite different from Features 1 and 2. Only the north end of the

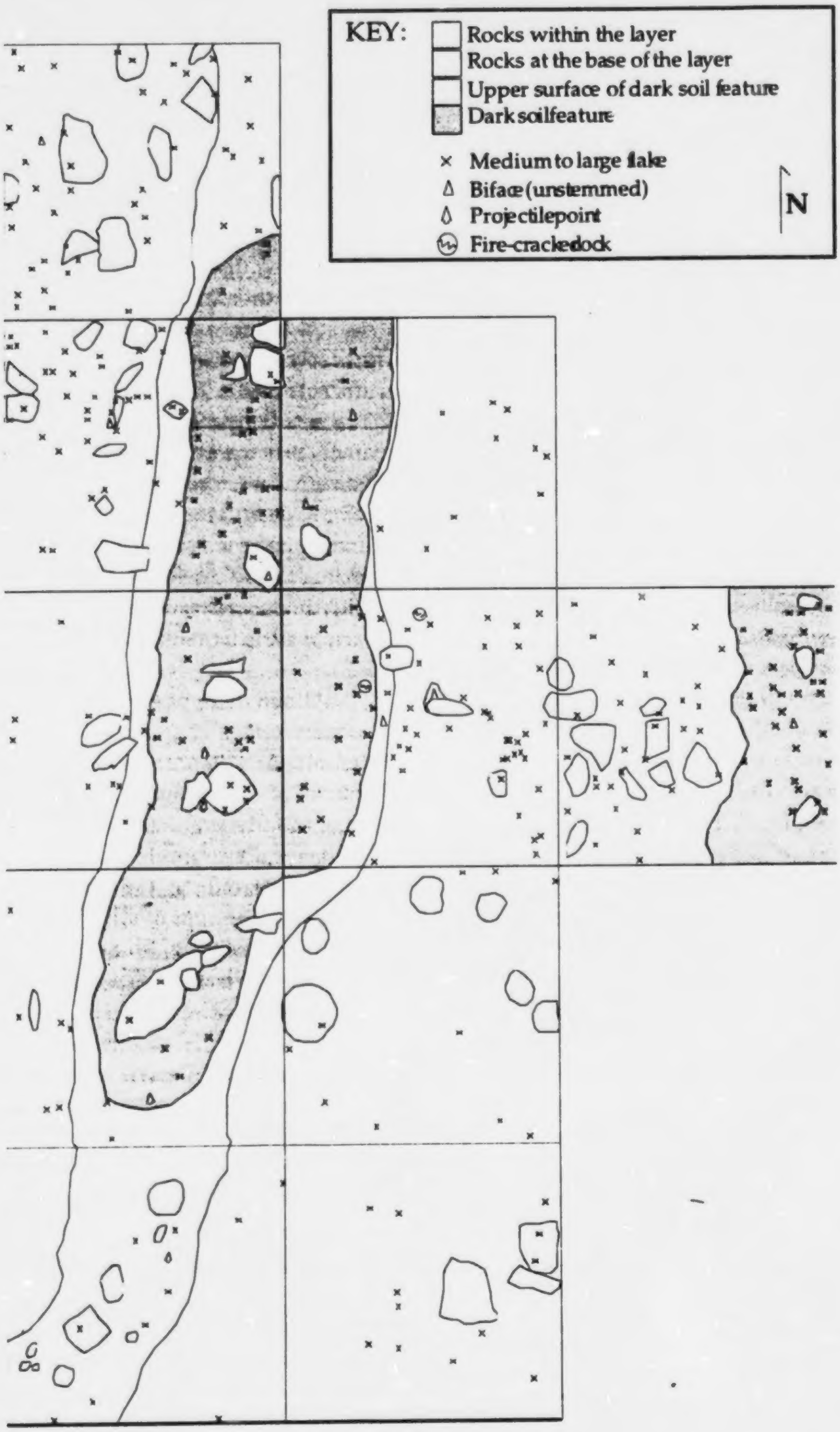

KEY:
☐ Rocks within the layer
☐ Rocks at the base of the layer
☐ Upper surface of dark soil feature
▨ Dark soil feature
× Medium to large flake
Δ Biface (unstemmed)
0 Projectile point
Fire-cracked rock
N

Figure 4.10: Plan view of Feature 2, in Area "A" of Newton's Point.

Table 4.5: Distribution of tools vs. debitage in Area A, contrasting Feature 2 with the surrounding cultural layers.

	No. pieces	N/unit area
Feature 2 (3.3 m2)		
Formal Tools	5	1.5
Debitage	197	59.7
Total lithic artifacts	202	61.2
Outside Feature 2 (7.7 m2)		
Formal Tools	23	3.0
Debitage	754	97.9
Total lithic artifacts	777	100.9

**Surface area is not equivalent to volume. The volume of soil in Feature 2 would be less in proportion of the volume of soil from outside of feature 2 than is implied by surface area, due to*

Figure 4.11: Plan view of Feature 3, Area "B", Newton's Point.

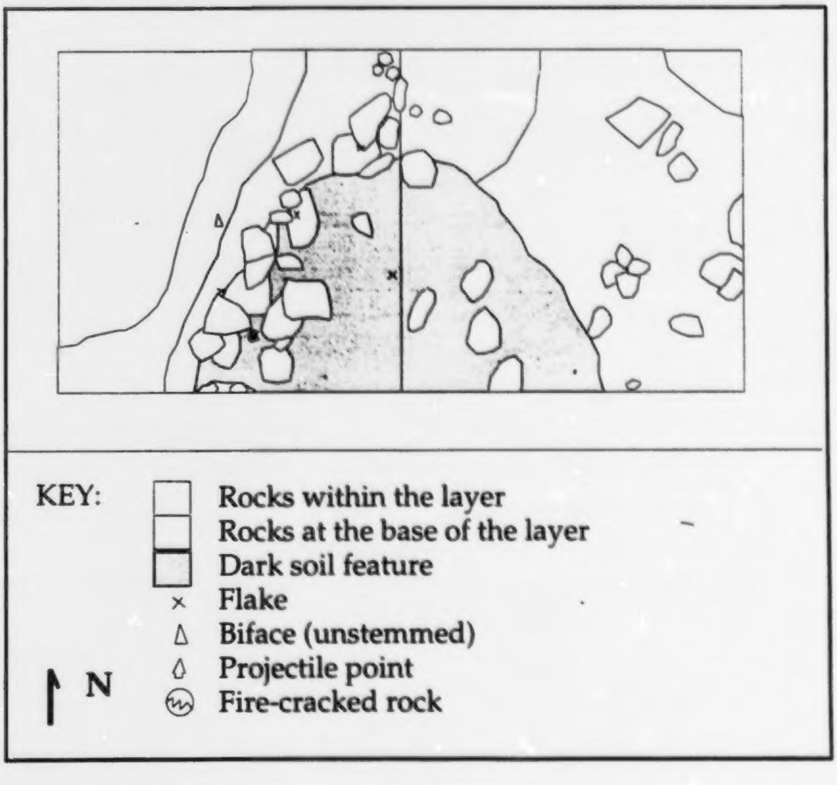
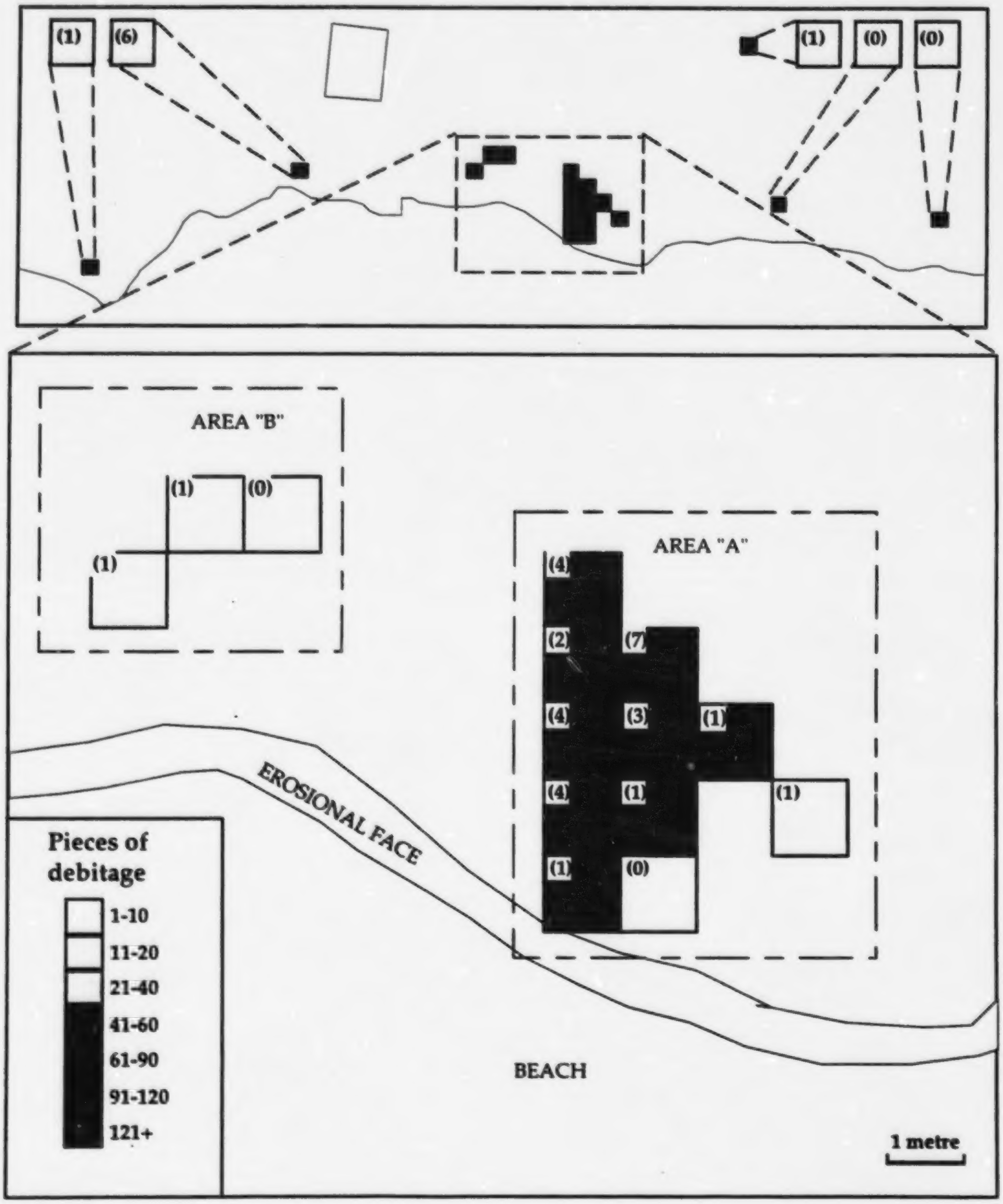

KEY:
☐ Rocks within the layer
☐ Rocks at the base of the layer
▨ Dark soil feature
× Flake
Δ Biface (unstemmed)
Projectile point
Fire-cracked rock
N

Figure 4.12: Distribution of lithic debitage (piece count indicated by hatching) and formal tools (piece count indicated by the number in the upper left hand corner) on Newton's Point.


(1)
(6)
(1)
(0)
(0)
AREA "B"
(1)
(0)
(1)
AREA "A"
(4)
(2)
(7)
(4)
(3)
(1)
(4)
(1)
(1)
(1)
(0)
EROSIONAL FACE
BEACH
Pieces of debitage
1-10
11-20
21-40
41-60
61-90
91-120
121+
1 metre

feature was excavated, so its shape and extent are unknown. The northern end was semicircular in cross-section (Figure 4.11). Unlike the features in Test Area A, the upper surface of Feature 3 was lined with medium-sized cobbles (15 to 25cm in diameter). Although no large chunks of charcoal or fire-cracked rocks were recovered, the soil within the feature was uniformly stained with black organic material and was peppered with very fine (<0.25cm in diameter) fragments of charcoal. At the base of the feature was a thin patch of leached grey-white sand. The overall artifact assemblage from Test Area B was different from Test Area A. Test Area A produced large quantities of lithic debitage (86 flakes/m^2), biface reduction flakes and bifaces, while Test Area B produced fewer

***Table 4.6:** Material classes by excavation area.*

Material	*Area A*	*Area B*	*Testing/ Surface*	*Total*
Lithic	1005	34	29	1068
Bone	1	-	-	1
Prehistoric ceramic	1	1	-	2
Historic glass	14	1	2	17
Historic metal	3	1	-	4
Wood	1	-	-	1
Other modern debris	1	2	1	4
Total	1026	39	32	1097

***Table 4.7:** Disposition of lithic artifact types by excavation area.*

Lithic type	*Area A*	*Area B*	*Testing/ Surface*	*Total*
Bifaces, stemmed	6	-	-	6
Bifaces, unstemmed	6	1	1	8
Bifaces, stem unknown	9	1	-	10
Unifaces (scrapers)	-	-	1	1
Retouched flakes	6	-	5	11
Utilized flakes	20	1	2	23
Flake debitage	929	29	15	973
Cores	27	1	2	39
Chopper/core tool	-	-	1	1
Groundstone	1	-	-	1
Abrasive stone	-	1	1	2
Hammerstones	1	-	-	1
Anvil stone	-	-	1	1
Total	1005	34	29	1068

flakes (10 flakes/m^2) and artifacts (Figure 4.12).

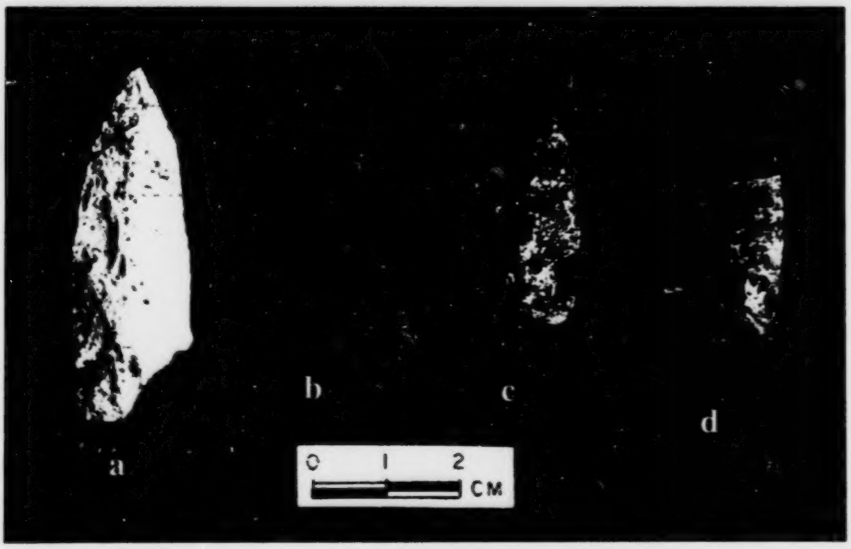
Lithic artifacts

Newton's Point produced large quantities of lithic debitage (waste flakes and cores), and a number of finished artifacts. The artifact types are presented below, while artifact materials are discussed in Chapter 5. Tables 4.6 and 4.7 summarize the composition of the assemblage and the artifacts recovered.

A number of these artifacts, particularly the bifaces and the uniface, lend themselves to a typological analysis. The stemmed bifaces fall into two classes, based on the attribute of expansion/contraction of the stem. The expanding stemmed points share a number of traits, and form a consistent type that is characterized by small size, with medium to narrow side-notches (Plate 4.10). Four projectile points fall into this class (BeDq-11: 83, BeDq-11: 460, BeDq11: 461, BeDq-11: 565). These points are similar to points occurring across a broad region in the LMW period, between 1500 and 600 bp, including the Brown site (Sheldon 1988: 173-177), the Goddard site (Bourque and Cox 1981), the Henry Point site (Cox 1987: 29), the Carson site (Sanger 1987), and the Kidder Point site (Spiess and Hedden 1983: 60). Based on his regional synthesis of the central coast of Maine, Bourque (1994: 83) has more narrowly classified these point types as Wiesenthal side-notched points, Variety 2. He indicates that they predominate from ca. 1050 bp (900 AD) to some time after 800 bp (1150 AD).

The remaining two points (BeDq-11: 191,

Plate 4.10: *Side-notched projectile points from the Newton's Point site; (a) is a blue-grey bleached volcanic or chert (GM37), (b) is a dark purple-red volcanic (GM64), (c) is a fine-grained blue-grey quartzite (GM08), and (d) is a red translucent chert (GM12) (Photo credit: David Keenlyside).*



BeDq11: 228) fall into the contracting stemmed class. Both of these points are fragmentary, and consist of the stem and a suggestion of the shoulder (Plate 4.11g and h). Both are characterized by a small rounded (almost pointed) base, and a contracting stem. Without elements such as shoulders and blades, it is difficult to postulate cultural affiliates for these points. In a general sense, points with contracting stems reoccur or persist through a number of time periods and regions, including the Camp site (Black 1992: 81), Kidder Point (Spiess and Hedden 1983: 62), and the Brown site (Sheldon 1988: 177). However, while they are not necessarily inconsistent with LMW time period suggested by the side-notched points, contracting stemmed points are more typically associated with EMW and MMW contexts.

In addition to the stemmed bifaces, 8 unstemmed bifaces and biface fragments (Plate 4.11, 4.12), and 10 biface tip and midsection fragments were recovered (Plate 4.13). Five of the unstemmed bifaces have

Plate 4.11: *Bifaces from the Newton's Point site; (a) to (e) are rectangular unstemmed bifaces, (f) is a side-notched projectile point, and (g) and (h) are contracting stemmed point fragments (photo credit: David Keenlyside)*

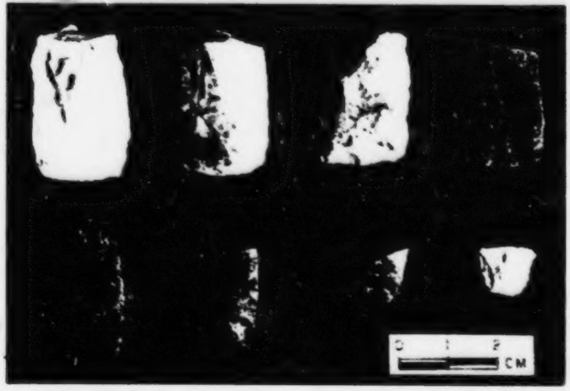
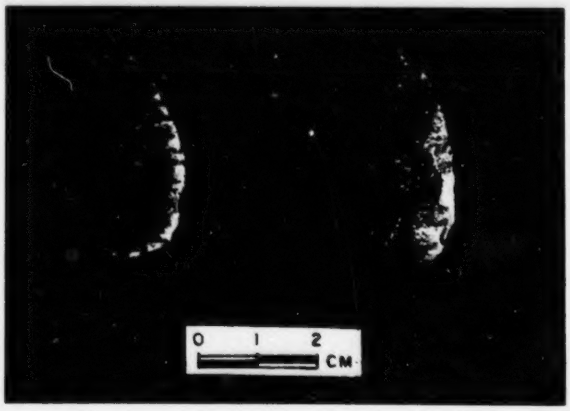


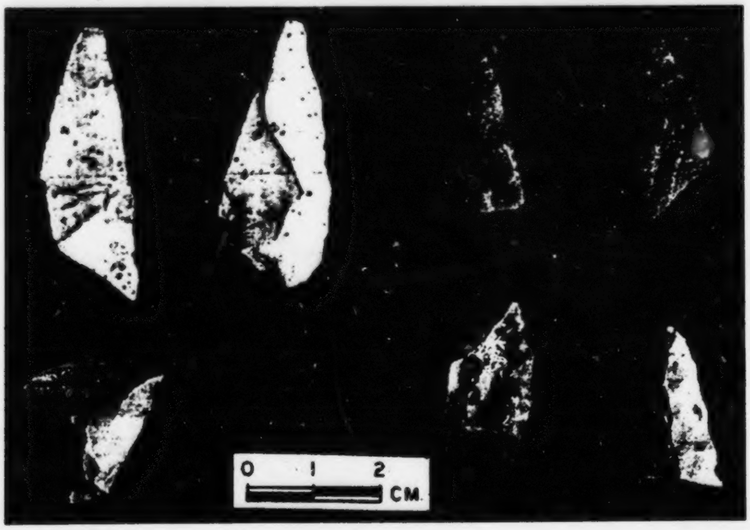
Plate 4.12: *Unstemmed bifaces from the Newton's Point site (photo credit: David Keenlyside)*



straight (rectangular) bases (Plate 4.11a to e) while 3 have convex bases (4.12a and b). The straight-based unstemmed bifaces are very uniform in size and shape and have very similar dimensions to the side-notched points from Newton's Point site (Plate 4.11). This suggests that they might be unfinished points or blanks. However, the straight-based bifaces are all broken between half and one-third of the way along the length. A similar pattern has been observed on other Maritime Woodland sites (e.g., Kidder Point), where they have been interpreted as knife blades which have been broken uniformly due to similar use and hafting (Spiess and Hedden 1983: 68-69). The biface tips and midsections are all in the size range of the stemmed and unstemmed bifaces, but none of them possess any further diagnostic attributes. None of them cross-mend with the recovered basal fragments, which may support the notion of that the bases represent use- and haft-related breakage with the tips being lost at a work locale, the haft being retained for reuse or recycling.

The single uniface (BeDq-11: 1119) recovered from Newton's Point is made from white quartz (Plate 4.14f), and is similar to the type known as "thumbnail scrapers" which are widespread on Maritime Woodland period sites in the Maine/Maritimes area (Bourque 1995: 180, 1971: 176; Foulkes 1981: 132). Data from some sites (e.g., Sanger 1971, 1987: 121) suggest that scraper size decreases throughout the Maritime Woodland period, to less than 12 grams, and averaging around 5 grams in the Late Maritime Woodland; the Newton's Point scraper weighs 1.8 grams, suggesting a late affiliation. In addition to the thumbnail scraper, 11 retouched flakes were recovered. These tools include a small suite of 4 distally retouched flakes (BeDq-11: 1120 to 1123) of mottled chert (Plate 4.14a to e)

Plate 4.13: *Biface tips and edge fragments from the Newton's Point site (photo credit: David Keenlyside)*



which are probably functionally similar to classic LMW scrapers, although the retouch is localized and less steep than on typical scrapers. Two of the retouched flakes (BeDq-11: 800 and BeDq-11: 1086) are thick, with coarse marginal retouch (Plate 4.15). These tools appear to be heavier, and may have been used for cutting, rather than scraping. One specimen of white quartz (BeDq-11: 1118) exhibits some steep retouch, but is broken longitudinally along the span, preventing its classification as a scraper. The remainder of the retouched flakes (4 specimens) are broken, or only slightly retouched.

The site produced a single ground stone object (BeDq-11: 1085; Plate 4.16). The battered butt end of the tool is present, as well as a portion of the shaft. Unfortunately the bit has broken off, so that it is impossible to assign it to a tool class. The shaft is subrectangular in cross-section, and the butt narrows to a point. A portion of the lateral side is roughened and reddish and may be cortical.

The piece is unusual because of the series of parallel and diagonal incised lines on the upper surface of the artifact. Generally, finely incised ground stone tools are associated with the Archaic period (e.g., Petersen and Langerak 1988: 30; Sanger 1973). However, the decoration style is also similar to incised patterns on pebbles that were recovered from Holt's Point, a large shell-bearing site in the Passamaquoddy Bay that dates to the MMW and LMW periods (Hammon-Demma 1984: 80). None of the artifacts reported by Hammon-Demma were formal tools. In addition, a single very small slate pendant from the Goddard Site (Cox 1995: pers. comm.) bears incised markings which are stylistically similar to the Newton's Point ground stone tool. It may be that such incised decorations represent a long-term stylistic continuum, of which the Goddard and Newton's Point examples are among the most

Plate 4.14: *Retouched flakes and endscraper from the Newton's Point site; (a) to (e) are retouched and utilized flakes of mottled red-brown chert (GM19), and (f) is a white quartz endscraper (photo credit: David Keenlyside)*

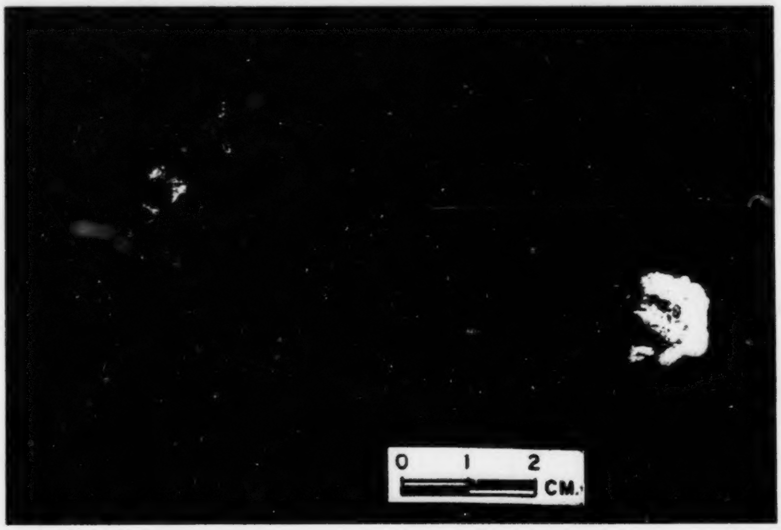


***Plate 4.15:** Retouched flakes from the Newton's Point site; both are dark volcanic (GM33) (photo credit: David Keenlyside).*

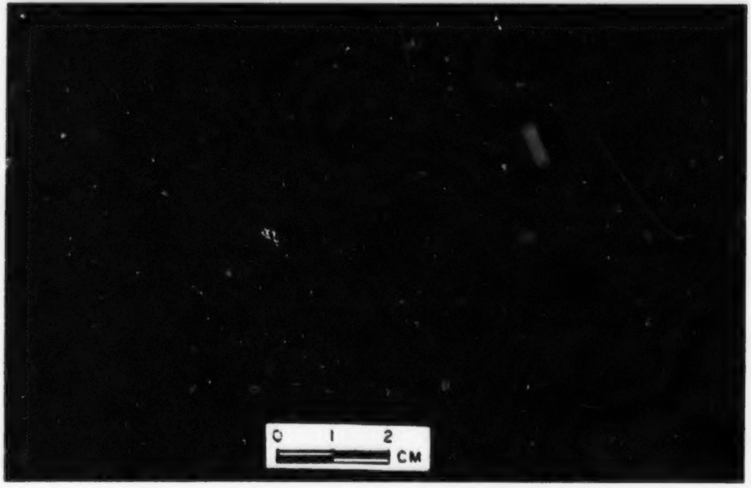
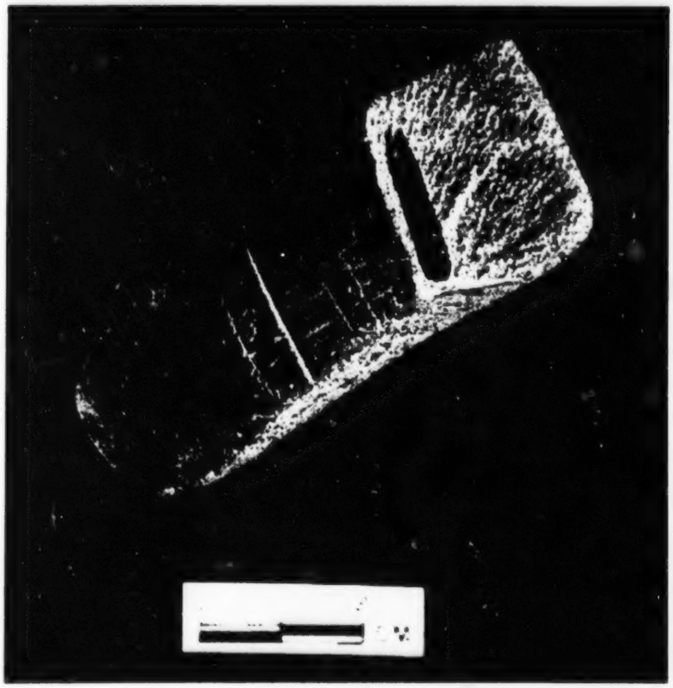


***Plate 4.16:** An incised ground stone tool recovered from the Newton's Point site (photo credit: David Keenlyside)*



recent.

Several implements for making other tools were recovered, including a small oval hammerstone (BeDq-11: 757), a small lap anvil of the type used in bipolar reduction (BeDq11: 1116; Plate 4.17), and an extensively modified abrader (BeDq-11: 22; Plate 4.18), with several long grooves that appear to be roughly the size of an adult beaver incisor, and may have been used for bone tool modification and sharpening.

Ceramic artifacts

Two very small fragments of prehistoric ceramic were recovered from Newton's Point (Plate 4.19). One fragment is shell-tempered (BeDq-11: 1062); the shell tempering has eroded out, leaving rectangular slots in a relatively homogeneous body. The sherd weighs 1.2 grams, and is 5.10mm thick; the maximum width of the fragment is 17.05mm. The interior, as identified by a very slight curvature, is blackened, and may be scarified. Despite its fragmentary nature, the temper and thickness of this sherd suggests that it is of the Late Maritime Woodland period, or Ceramic Period (CP) 5 to 6, using the aboriginal ceramic sequence established by Petersen and Sanger (1991: 144-155). These periods are thought to range from 950 to 400 BP. The second sherd (BeDq-11: 1153), is larger, but lacks identifiable attributes. It is a grit-tempered ceramic; the grit consists of coarse sand, with many large white quartz grains. The sherd weighs 1.3 grams, and 18.20mm wide (max). It is 7.05mm thick, although it may be that one surface is missing, making an accurate assessment of thickness difficult.

Organic material

The only organic material recovered from the Newton's Point site was a single small and unidentifiable fragment of calcined bone. Poor organic preservation is typical of non-shell-bearing sites in the Maine-Maritimes area, due to the acidity of the soil.

Plate 4.17: An anvil stone from the Newton's Point site (photo credit: David Keenlyside)

Plate 4.18: *An abrader from the Newton's Point site (photo credit: David Keenlyside)*

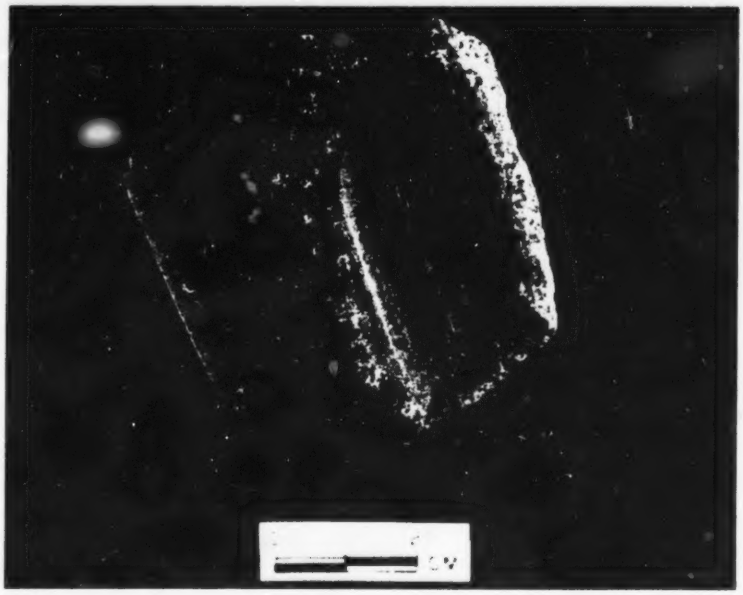
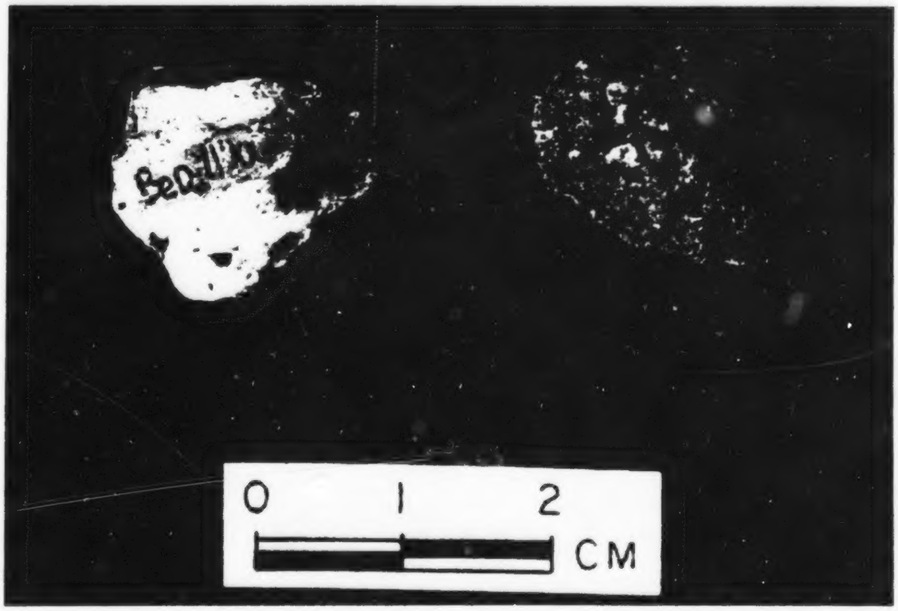


Plate 4.19: *Ceramic sherds from the Newton's Point site (photo credit: David Keenlyside)*



Debitage analysis

All stone flakes (including unmodified flakes, utilized flakes and retouched flakes) were classified according to stages of lithic reduction (primary, secondary and tertiary) with the results presented in Table 4.8. Biface reduction was the activity that produced most of the debitage on the site, and was particularly prominent in Area A (Table 4.8, Figure 4.13). In general, primary debitage was more significant in Area B than Area A, where secondary and tertiary debitage predominates (Figure 4.13). The large number of "unknown" flakes is attributable to shatter and breakage (only 63% of specimens were complete).

Both bipolar and bifacial reduction were carried out at the site. Significantly more bipolar cores and core fragments were recovered (n=20) than bifacial cores and core fragments (n=12). This is in contrast to the predominance of bifacial debitage and tools in other aspects of the assemblage, and may suggest that bifacial cores were being reduced to finished artifacts, while bipolar cores were discarded once they were exhausted of useable flakes.

Table 4.8: *The lithic assemblage from Area A ("A"), Area B ("B"), and the testing/surface units (T/S), according to lithic reduction stages.*

		"A"		"B"		T/S		Total	
Stage	*Flake type*	#	%	#	%	#	%	#	%
Primary	Decortication	50	5%	8	27%	3	13%	61	6%
	Core reduction	181	20%	1	3%	7	29%	189	19%
Secondary	Biface thinning	376	40%	4	13%	8	33%	388	40%
Tertiary	Pressure	60	6%	1	3%	-	-	61	6%
	Retouch	-	-	-	-	-	-	-	-
Unknown	n/a	265	29%	16	54%	6	25%	287	29%
Totals		932	100%	30	100%	24	100%	986	100%

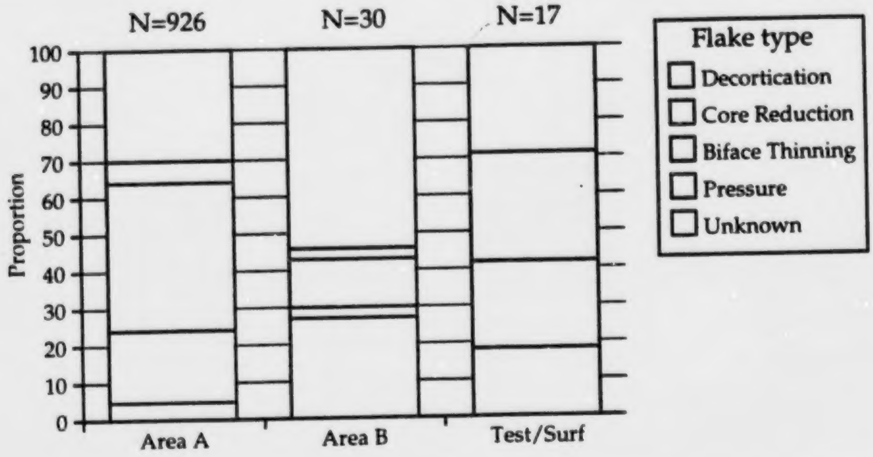


Figure 4.13: The proportion of flake types by area for the Newton's Point site (BeDq-11).

Chapter 5
INTEGRATION AND INTERPRETATION

In the previous two chapters, the archaeological information from the GMA was described. In this chapter, this information will be contextualized and integrated into an interpretive framework. In the first section, a cultural history schema is proposed, and the data from individual sites is integrated into it. This is followed by a discussion of site structure and settlement in the GMA. The patterns visible in the archaeological information from the GMA are compared to those reported elsewhere in the Maine/Maritimes area. In the final section, this information will be integrated into the regional narrative, by comparing the material from the GMA to that gathered from elsewhere in the Maine/Maritimes area. The evidence for regional interaction, and interpretations of the nature of exchange networks will be discussed. In the context of this discussion, analytical approaches to the study of "culturally exotic" lithics will be reviewed and critiqued. Finally, the Grand Manan lithic assemblage will be assessed in terms of its contribution to the study of regional interaction and lithic exchange.

A CULTURAL HISTORY FRAMEWORK

Based on the stylistic analysis of artifacts and the radiocarbon dating of archaeological deposits, a crude cultural history framework for the GMA can be proposed. The evidence suggests that there were at least six periods of prehistoric activity in the GMA. Using cultural history terminology and schema developed for the Maine/Maritimes area (Figure 1.3), these occurred during:

(i) the Middle Archaic period,
(ii) the Late Archaic period (Moorehead phase),
(iii) the Terminal Archaic period (Susquehanna Tradition),
(iv) the Early Maritime Woodland period,
(v) the Middle Maritime Woodland period, and
(vi) the Late Maritime Woodland period.

This assertion is derived from a variety of sources of information (Table 5.1).

The Archaic Period

The Middle Archaic (ca. 7000 - 5000 bp)

The earliest evidence of human activity in the GMA is the Ritchie Point, which, based on stylistic grounds, was made during the Middle

Archaic period (7000 to 5000 bp). However, since this artifact was recovered in a scallop drag, any other cultural material that might be associated with this find has either been destroyed by erosion, or is subtidal and effectively beyond the reach of land-based archaeological techniques.

The Late Archaic, Moorehead phase (ca. 4500 - 3800 bp)

The earliest widespread evidence of settlement in the GMA is comparable to the"Moorehead phase" material identified on sites in Maine (Bourque 1992, 1995; Bourque and Cox 1981) and New Brunswick (Harper 1956; Sanger 1973), which dates to between 4500 and 3800 bp (Bourque 1994). This evidence consists of artifacts, including a gouge and bifaces from Nantucket Island (the Grand Manan Museum, Moses collection), projectile points from Phillip's Point (the Romig collection), and projectile points in the Smithsonian's Grand Manan collection. The current evidence in the Maine/Maritimes area indicates that Late Archaic peoples were focused on marine resources and exploited offshore species such as swordfish (Bourque 1995). Lithic materials (i.e., Ramah Bay quartzite) and artifact types from as far north as northern Labrador are indicative of the movement of materials, ideas and possibly people over great distances. Heavy woodworking tools in Late Archaic assemblages, such as the groundstone gouge from Nantucket Island, have caused some researchers to infer that large, ocean-going dugouts enabled this movement (Snow 1980: 211). The position of the GMA at the nexus of the Bay of Fundy and the Gulf of Maine would not have been an impediment to such seagoing people. Indeed the GMA might have been an ideal stopover or location for settlement for them.

Unfortunately, few of the Late Archaic period finds can be associated with extant archaeological sites, and no intact Archaic

Table 5.1: The cultural history ascription of archaeological information from the GMA.

Collection or Site Name	*Culture Period*
The Smithsonian's GM collection	Late Archaic to Late Maritime Woodland
The Grand Manan Maul	Susquehanna
The North Head Axe	Susquehanna
The Romig Collection	Late Archaic
The Ritchie Point	Middle Archaic
Nantucket Island	Late Archaic to Late Maritime Woodland
Kent Island site (BdDq6)	Terminal Archaic/Early Maritime Woodland
Ingall's Head/Mike's Point	Unknown
Indian Camp Point (BeDq12)	Early Maritime Woodland
Newton's Point site (BeDq11)	Late Maritime Woodland
Baird site (BdDq3)	Middle to Late Maritime Woodland

period deposits were encountered during the GMAP II. This indicates that most of these earlier sites are now completely eroded, as is the pattern in the QR (Black 1992: 149).

Terminal Archaic, Susquehanna Tradition (ca. 3700 - 3000 bp)

The most widely recognized Terminal Archaic manifestation in the Maine/ Maritimes area is the Susquehanna Tradition. Most research suggests that this tradition developed in the mid-Atlantic region of the US, and subsequently appeared in the Maine-Maritimes region between 3800 bp and 3700 bp (Bourque 1994, 1995, but also see Deal 1985). The transition from Late Archaic (as manifested in Moorehead phase assemblages) to Terminal Archaic (as manifested in Susquehanna tradition assemblages) to Early Maritime Woodland (EMW) is poorly understood (Black 1992: 149; Deal 1985, 1986). However, sudden appearance of the Susquehanna tradition, which is significantly different in technology and economy from the previous Moorehead phase, has been explained by the wholesale northeasterly movement of a group of people from the central US (Bourque 1995). Unlike material from the Moorehead phase, Susquehanna assemblages suggest a significant terrestrial focus to subsistence activity (Bourque 1995) and a lack of extraregional activity in the form of lithic procurement and exchange (Bourque 1994: 29). These interpretations suggest that the GMA would not be a likely locale for Susquehanna activity. Nonetheless, two artifacts from the GMA, the grooved North Head Axe and the Grand Manan maul, suggest that some Susquehanna activity may have occurred. Unfortunately, these artifacts are unprovenienced, and intact archaeological deposits containing similar artifacts were not located. Recognition of less typical artifacts may impede this analysis. A better grasp of regional manifestations of the Susquehanna tradition is needed for a clearer understanding.

The potential for intertidal or sub-marsh sites from the Terminal Archaic period exists on Grand Manan, similar to those encountered elsewhere in the Maine/Maritimes area, such as the Rum Beach site (Black 1995) and Seabrook Island (Robinson and Bolian 1987). The Kent Island site (BdDq6) produced a projectile point similar to specimens in the Maine/Maritimes area that have been dated to the period from 3500 to 2500 bp (Black 1992: 69; Ritchie 1971: 39; Sanger 1987: 37-38). Subareal peat eroding on the beach in the site area (ca. 4m below the high water line) is similar to peat dated to ca. 3300 bp from Whitehead Island, and may support the inference that the point and the peat are contextually related.

The Maritime Woodland period

The Early and Middle Maritime Woodland (ca. 3000 - 1500 bp)

An Early Maritime Woodland (EMW) Native presence is suggested by the projectile point recovered from the Indian Camp Point site (BeDq12). Several other artifacts, including the Kent Island biface and projectile point, and specimens in the Smithsonian's Grand Manan collection, have characteristics that can be assigned to a wide range of dates which include the EMW period, and suggest the potential for other EMW period components in the GMA.

A Middle Maritime Woodland (MMW) component was identified in the Baird site (BdDq3), and was dated to 2030±90 bp. Unfortunately, no diagnostic artifacts from this time period were encountered in GMA collections or assemblages, suggesting that occupation during this period was not widespread.

The Late Maritime Woodland (ca. 1500 - 500 bp)

The assemblages and collections examined during the GMAP II suggest that there was significant Late Maritime Woodland settlement in the GMA. The two excavated sites, the Baird site and the Newton's Point site, both produced LMW components. Furthermore, the Smithsonian's Grand Manan collection and the Moses collection (from Nantucket Island) have produced characteristic LMW period artifacts such as small, narrow side-notched projectile points. However, unlike LMW period assemblages from the QR and the CCM, scraping implements, and in particular small steep-edged endscrapers, are conspicuously rare, with only 2 specimens from all GMA collections and assemblages. Another characteristic of LMW sites in the Maine/Maritimes area is the presence of "exotic", or culturally imported, lithic materials, generally interpreted as evidence for regional exchange (Bourque 1994).

Because of the quality of the information available from the Newton's Point site and the Baird site, it is possible to infer more about Woodland period activity than is possible with the Archaic material from the GMA. Interpretations about the nature of Native settlement and the kinds of activities that they represent are presented below.

SITE STRUCTURE AND SETTLEMENT IN THE GMA

The Baird site

Black (1992) has identified a number of characteristic site types for the QR. The Baird site fits into the category of "large, shallow shell-bearing sites":

> *These sites are characterized by areas greater than 100m^2 and depths of 40 cm or less. They contain less readily defined stratification, and less distinct floor and midden features than large deep middens, and are usually incorporated into developing soil profiles rather than between distinct soil layers. All have been subject to natural pedogenic disturbances to a significant extent (Black 1992: 51).*

All of the excavated large shallow shell-bearing sites in the QR have produced radiocarbon dates that fall in the MMW to LMW period, with the exception of two sites that also contain dates from protohistoric to historic period components (Table 5.2, below).

This pattern seems to be reflected in parts of the CCM as well, where MMW and LMW period sites, such as Fernald Point, the Weisenthal site, and the Hunneman site (Figure 5.1) have been excavated (Sanger and Johansen 1984; Bourque 1992). This pattern suggests that during the MMW period in the QR and the CCM, people began to settle in larger, less dispersed communities (Black 1992: 153). The C14 date for the Baird site, 1600±80 bp corresponds well with the dates from the QR, and while the Baird date when calibrated (2030±90 bp) is older than those in Table 5.2, it is still within the MMW period, and may reflect an early manifestation of this trend.

However, a second factor confounds the categorization of the Baird site — its anomalous location. Virtually all shell-bearing sites in the Maine/Maritimes area are characterized by "...an erosional scarp along the seaward limit clearly [indicating] that some portion of the site as been lost to erosion..." (Bourque 1995: 2). In essence, a key feature in shell-midden identification in the Maine/Maritimes area is their location at the interface of the land and the sea, as indicated by the presence of a truncated vertical face containing eroding midden debris. By the shortest measurable distance, the Baird site is ca. 90m from the beach. No part of the site is currently eroding, and its presence is only indicated by historic period disturbance.

The only other large shell-bearing site reported in the archaeological literature that matches this pattern is the Pendleton Passage site (Black 1983). This site is located in an open meadow several metres above and more than 50 m from the nearest beach. An historic cellar is located near the site, and accounts for the disturbance exposing the site (Black 1983). A sample of marine shell from the Pendleton Passage site produced an uncalibrated C14 date of 1620±70 bp. This corresponds well with the date from the Baird site (1600±80 bp). Calibration of the Pendleton Passage site may produce a date similar to the Baird site.

Several explanations could account for these anomalous site locations:

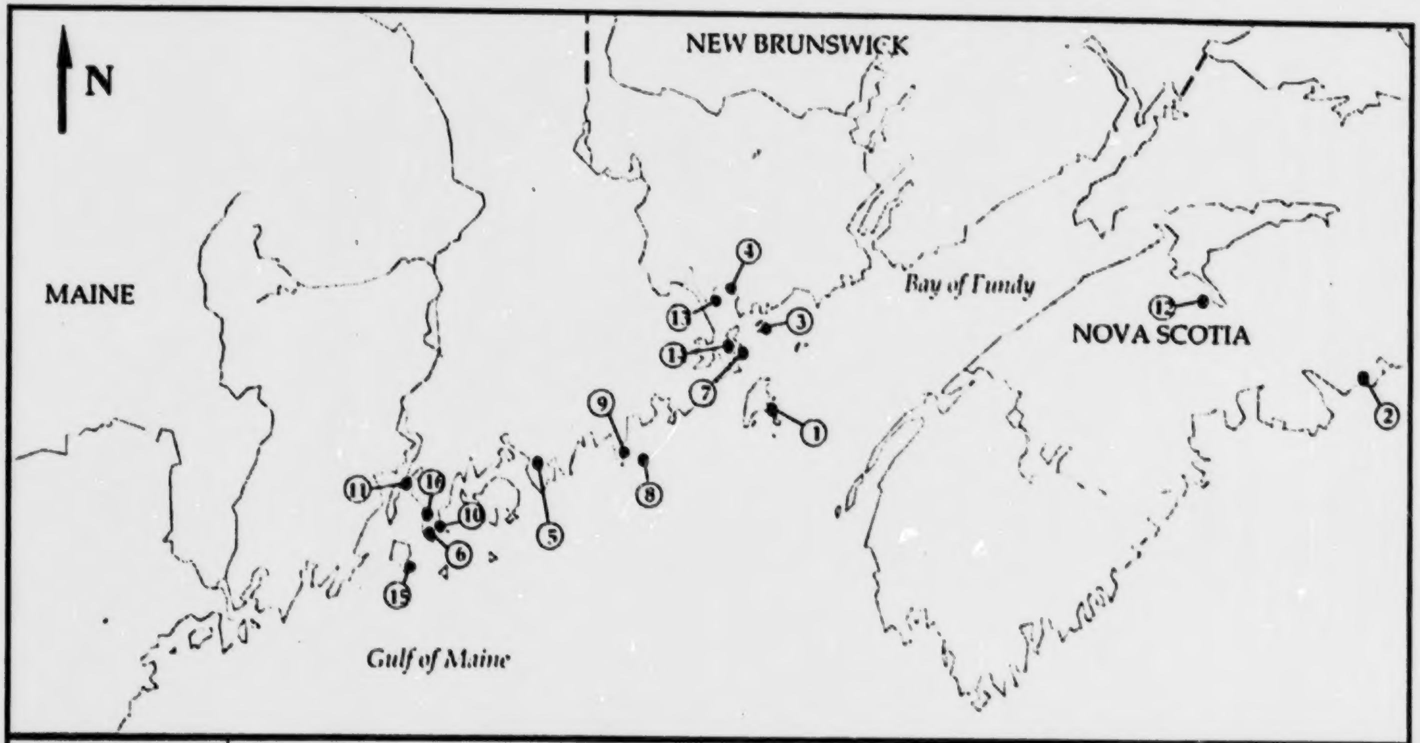
(i) changes in local geomorphology,
(ii) unusual site utilization and function, and
(iii) lack of pattern recognition by archaeologists.

The first explanation appears to be logically untenable. In a region characterized by rising sea-levels and coastal erosion, these sites would have been even further from shoreline in the past. The second explanation is difficult to assess as neither the Baird site nor the Pendleton Passage site have been explored extensively enough to understand internal structure and patterns of settlement. However, given the large size and dispersed nature of both of the sites, it is unlikely that they are the result of a specialized activity, but rather the result of a wide range of activities, as might occur at a base camp or major seasonal settlement. By process of elimination, the latter explanation seems the most likely. If these two sites had not experienced significant historic activity which exposed their deposits, and brought them to the attention of archaeologists, it is unlikely that they would

Table 5.2: Radiocarbon dates from large shallow shell-bearing sites in the Quoddy region (MMW = Middle Maritime Woodland period, LMW = Late Maritime Woodland period, Protohist. = Protohistoric period, Hist. = Historic period; see Figure 1.3 for cultural history schema and Figure 5.1 for site locations)

Site name	*Location*	*Lab #*	*Date*	*Material*	*Period*
Camp	Bliss Islands	B21138	1650±70	charcoal	MMW
		B8196	300±50	charcoal	Protohist./Hist.
Pendleton Passage	Deer Island	B8199	1620±70	shell	MMW
Gooseberry Point	Campobello Isl.	B4190	660±50	charcoal	LMW
		B34190	830±60	shell	LMW
Teachers Cove	Bocabec	S609	1635±60	shell	MMW
		S608	1170±100	shell	LMW
Carson	Bocabec	S12187	1120±65	charcoal	LMW
		S510	925±80	charcoal	LMW
		S12186	420±90	charcoal	Protohist./Hist.

Figure 5.1 Archaeological Sites in the Maine/Maritime area, referred to in the text.


N
MAINE
NEW BRUNSWICK
Bay of Fundy
NOVA SCOTIA
Gulf of Maine
1
2
3
4
5
6
7
8
9
10
11
12
13
15
16

1	Baird site/Newton's Point	7	Gooseberry Point	12	Melanson
2	Brown	8	Great Spruce Island	13	Ministers Island
3	Camp/Weir/Rum Beach/Northeast Pt	9	Henry Point	14	Pendleton Passage
4	Carson/Teacher's Cove	10	Hunneman	15	Turner Farm
5	Fernald Point	11	Kidder Point	16	Weisenthal
6	Goddard				

ever have been recorded. This suggests the possibility that other sites adjacent to, but not actually on, the shoreline remain to be discovered in the Maine/Maritimes area. This hypothesis is supported by the sporadic recovery of prehistoric artifacts in historic sites set back from the shore or in the interiors of islands in the QR (C. R. Blair 1996: pers. comm.).

During the excavation of the Baird site, material for only one C14 date was recovered. Furthermore, the artifacts found were undiagnostic of any particular cultural period. Although most of the site conforms to the structure expected of a large, shallow MMW shell-bearing site, the small sample size and the large site size suggest that more than one cultural component and perhaps several sequential occupations may be represented on the Baird site. For example, in contrast to others, Units AL43 and AL44 produced shell-free layers rich in lithic debitage. The presence of a northern-style microblade in one of these units, and the quantity and variety of lithic materials is suggestive of a LMW component (see discussion of lithic materials, below). Furthermore, the lack of eroding deposits suggests the possibility of older Archaic period components at the Baird site. Archaic components are thought to be the first portions of multi-component sites to erode (Bourque 1995; Kellogg 1982; Sanger 1979) the anomalous pattern of erosion on Cheney Island may have resulted in their preservation.

The Newton's Point site

The Newton's Point site is a shell-free single component site. The 1995 excavations revealed this to be a Late Maritime Woodland component, dating to ca. 1000 years ago. In this section, regional correlations to this site type, and possible interpretations of its function and use will be considered.

Shell-free sites dating to the Maritime Woodland are uncommon along the coast of the Maine/Maritimes area (Black 1992: 52; Bourque and Cox 1981: 4). In the archaeological literature of Maine, these sites are referred to as "black soil middens":

> *These sites are rare but tend to be very productive in cultural remains. The lack of shell in these sites is thought to relate to site seasonality, but is still poorly understood (Cox 1987: 18-19).*

The most notable of Maine's "black soil midden" sites is the Goddard site, in Blue Hill Bay (Figure 5.1). Goddard is very large, and has produced remarkable quantities of artifacts, most of which are derived from a LMW component dating to around 750 years ago (Bourque and Cox 1981: 13). The artifacts from Goddard are stylistically typical of those produced on sites from the period between 1000 and 600 years ago in the CCM, but the scale of the site and the size of the assemblage are unusually large; over 30,000 artifacts (90% of which are from the LMW component) were recovered from the site prior to 1981 (Bourque and Cox 1981: 4). A significant portion of these artifacts are considered to be made of "exotic" (culturally imported) lithic materials. The Goddard site has been a major force in the formation the concept of the "black soil midden", both in terms of the association with archaeological productivity, and in terms of functional interpretations. It has also spawned interest in finding and understanding sites of this type (Cox 1987: 19).

Although shell-free sites are known from in the QR, there too they are considered to be atypical of coastal sites. These sites vary somewhat from the "black soil middens" of Maine. The best known example is the Northeast Point site, on the Bliss Islands (Figure 5.1):

> *There are few non-shell prehistoric sites recorded in the Quoddy region, and the Northeast Point site on the*

> ***Bliss Islands is apparently the only one from which an in situ artifact assemblage has been recovered... There is no indication in the literature that features have previously been recognized in non-shell prehistoric sites in the Quoddy region (Black 1992: 52).***

The Northeast Point site produced two radiocarbon dates: 1500±70 bp (B-23160) and 1280±80 bp (B-40899). The artifacts recovered consist almost entirely of lithics. Most of these are scrapers and of the total lithic assemblage, 6 to 8% (by weight) is made from "exotic" (culturally imported) materials (D. Black 1996: pers. comm). These artifacts appear to be the result of a single brief occupation (Black 1992: 90). Although the Northeast Point site produced high artifact densities compared to other Bliss Island (shell-bearing) sites (Black 1992: 64), these densities are not as high those at Goddard. Furthermore, Northeast Point is also different from Goddard (as well as QR shell-bearing sites) in its anomalous site location — exposed to the northwest, and not adjacent to a "high productivity" intertidal zone. Black (1992: 62) has speculated that this association may be typical of non-shell sites in the QR (Black 1992: 62). He has also suggested that erosion may have affected the modern site configuration at Northeast Point to such an extent that the shell-free nature of the site, as well as orientation and site location may result entirely from post-occupation erosion (Black and C. R. Blair 1992).

Three interpretations of why non-shell sites are different from shell-bearing sites will be considered here:

i) non-shell sites are functionally different from shell-bearing sites,

ii) shell-bearing and non-shell sites represent a range within a single type differentiated by the density of shellfish remains, which in turn affects the degree of preservation of shell and other organic remains, and

iii) the horizontal distribution of shellfish on sites is variable, and the apparent differences between non-shell and shell-bearing sites is a function of the degree of erosion and location of excavation units.

Based on sites such as Goddard and the Northeast Point site, many archaeologists favour the first interpretation (Black 1992: 90; Cox 1987: 19). Indeed, in these cases, there is some evidence to support this view, such as the unparalleled size of Goddard and the locational anomalies of the Northeast Point site. However, such evidence in not visible at all non-shell sites, necessitating the consideration of other explanations.

The second explanation, which accounts for the presence or absence of shell on archaeological sites by variations in shellfish densities is supported on sites where there is some evidence that shellfish may have been a part of the original site matrix. The Baird site is an excellent example of this. Two of the excavation units from this site produced no marine shells at all, but did produce a number of soft, black, papery mussel periostracha. When large numbers of shellfish are deposited in a site, the calcium carbonates act to neutralize the natural acidity of the soil. This neutralizing effect results in the preservation of the mineral components of organic materials (e.g., the hard portions of bones), as well as materials such as the shells themselves. However, small quantities of shell may be insufficient to counteract soil acidity, particularly if they are exposed or near the surface for a time. Conversely, soil acidity may actually preserve soft organic material, such as periostracha, as it also inhibits soil fauna which would consume them. The periostracha suggest that these units cannot be interpreted as non-shell units, and vary from classic shell-bearing deposits (those containing visible quantities of whole shells and shell fragments) in degree, not kind.

However, the undisturbed cultural deposits at Newton's Point apparently do not contain periostracha, or other evidence of shellfish harvesting. The third explanation, which suggests that erosion and/or sampling accounts for some of the apparently shell-free sites, best fits the Newton's Point site. When Baird excavated the site in 1869, he found it to be a substantial shell midden which produced quantities of bones, stone tools and debris (Baird 1881: 294). Since Baird's work, there have been at least two major storm events, the Saxby Gale of 1869 and the Groundhog Day storm of 1976, and a number of lower intensity hurricanes, gales and storms that have impacted the point. According to the landowner and other local residents, more than 2m of land disappeared from Newton's Point during the Groundhog Day storm alone. The beach in front of the site has a gradient of only 3.5°. Under such conditions, a vertical rise in sea level of a few centimetres translates into a much larger lateral rise. These factors make it entirely possible that 10m to 20m have been eroded from the front of the site since Baird's time. This explanation may be supported by the site stratigraphy. The presence of a widely distributed, thin layer of shell under the sods may be explained by shell being washed out of the front of a midden deposit and carried by a storm surge or similar phenomena well back onto the landward surface of the site.

Several sites with deep shell-bearing deposits (Great Spruce Island site, in the Roque Islands, Maine, and Minister's Island (BgDs-10), Passamaquoddy Bay, New Brunswick; Figure 5.1), have revealed shell-free features behind them (i.e., on the landward side) (Sanger and Chase 1983: 2; Sanger 1987: 106, 115). These features have been interpreted as evidence of houses. The non-shell component of the Great Spruce Island site bears a striking resemblance to the deposits at Newton's Point:

> *Once we had tested the areas thought to be [shell] dumping areas we explored the northwest portion of the site for evidence of houses. A 50 cm wide trench into the woods behind the shell quickly revealed the presence of typical house fill: shell free, charcoal-stained gravel; low bone counts; high artifact yields, especially stone flaking debitage and artifacts broken in manufacture... From what we could excavate, we judge an oval depression about 2.5 m across... (Sanger and Chase 1983: 2).*

The Great Spruce Island feature was radiocarbon dated to ca. 1100 years ago, and was associated with a quantity of bifaces and bifacial debitage, and some potsherds. However, to the surprise of the researchers, no scrapers were found. The trench which produced this material was 20m from the beach at its closest. Unlike Newton's Point, the Great Spruce Island site is sheltered in a small cove in the centre of the island group. If the site had been exposed to erosion as severe as observed at Newton's Point, the contents, features, and structure of Great Spruce Island would be remarkably similar to Newton's Point.

The Henry's Point site is a non-shell site outside Jonesport, on the mainland of Maine, immediately adjacent to the Roque Islands (Figure 5.1; Cox 1987). Like Newton's Point, Henry's Point is on a heavily eroded point of land. Although the prehistoric cultural deposits on both sites are shell-free, both have occasional patches of shell along the erosional face. The artifact assemblages are also similar, with a large proportion of debitage (mainly biface reduction flakes) and small side-notched points, but very few scrapers or ceramics. The features encountered on Henry Point were smaller than those at the Great Spruce Island site and Newton's Point (1.2m by 0.6m), but otherwise remarkably similar:

> *The nature and function of the pit feature is unclear, beyond its obvious association with biface reduction. The coarse sand layer and flat bottom of the pit are reminiscent of house deposits, but it is obviously too small to have been a habitation structure. Our best guess, and it is only that, is that this feature may be the remains of a small temporary shelter for a single individual working on tool (biface) manufacture (Cox 1987: 25).*

These examples suggest that defining a site type based on the absence of shell deposits is overly simplistic. However, they also suggest that there are patterns within shell-free deposits that may assist with the analysis of Newton's Point, and the identification and interpretation of similar sites. The above discussion suggests that Feature 2 at the Newton's Point site is typical of some features from LMW contexts. The shared characteristics of these features are:

(i) morphology (oval, 1 to 4m long, and 0.5 to 1.5m wide),
(ii) matrix (relatively shell-free, charcoal-stained loamy sand),
(iii) artifact content (high proportions of bifaces and biface debitage, low proportions of scrapers and ceramics),
(iv) location (the landward margin of shell-bearing sites), and
(v) age (ca. 1000 years ago).

The small size of these features suggest that they may be the remains of structures that were casual in nature (e.g., a temporary lean-to), or had a specialized purpose. The low frequencies of ceramics and utilitarian objects such as scrapers corroborates the impression that they are not the remains of typical domestic dwellings, while the high incidence of lithic debitage suggests another functional explanation. Based on the analysis of Henry's Point, Cox (1987: 25) has suggested that this type of feature represents specialized lithic workshops. The material evidence supports this interpretation. Furthermore, the placement of flaking stations (and the resulting quantities of small sharp debris) away from high traffic areas has inductive "common sense" appeal. This pattern would also explain why such features are the last portion of the sites to erode. In the following section, the implications of the appearance of lithic workshops on some LMW sites are discussed.

REGIONAL ANALYSIS AND INTEGRATION

As local cultural history sequences developed in the 1970's and 1980's, archaeologists began to notice patterns in artifacts and assemblages that linked the Maine/Maritimes to other parts of the Northeast. These patterns were visible not only in the forms and frequencies of tools, but in the recognition of materials which originated from sources at some distance from the local resource catchment (Bourque 1994: 23). The study of these regional interactions has become a significant research effort in the Maritime Peninsula, largely pursued through an analysis of locally obtained versus culturally imported (or "exotic") lithic materials (e.g., Black 1992; Black, Wilson and MacDonald 1996; Bourque 1994; Bourque and Cox 1981; Chalifoux and Burke 1995; Codere 1995; Crotts 1984; Doyle 1995; Keenlyside 1996; MacDonald 1994; Sanger 1987).

Evidence for Regional Interaction

Archaeological evidence from the Maritime Peninsula suggests that over the last 5000 years, there have been fluctuations in the extent that local groups interacted with neighbouring and distant peoples. This interaction is manifested in artifacts, mortuary practices, and the use of "exotic" lithic materials (e.g., Black 1992; Bourque 1994; Doyle 1995, MacDonald 1994; Sanger 1973). Evidence of regional interaction is most conspicuous during the Late Archaic period ("Moorehead phase", ca. 4500 to 3800 bp), the EMW period (the Adena complex and the Middlesex phase, ca. 2500 to 2000 bp), and during the LMW (ca. 1200 to 400 bp) (Bourque 1994). In the Late Archaic and EMW periods, exotic materials are strongly associated with mortuary ceremonialism (Bourque 1994: 34). However, the evidence for LMW interaction is almost exclusively found in habitation contexts.

The Goddard site, in Blue Hill Bay, Maine (Figure 5.1) first and most strongly suggested LMW interaction in the Maritime Peninsula. Subsequently Goddard has come to characterize many of its aspects. These characteristics include a focus on the production of small endscrapers (thumbnail scrapers) and small side- and corner-notched projectile points using brightly coloured fine-grained materials, the use of native copper, and a reliance on exotic material sources that lie to the east and north. Based on Goddard and other sites from the CCM, these characteristics are thought to begin to appear after 1000 years ago (Bourque 1994: 34), while in the QR, they may date to as early as 1500 bp (Black 1992: 78, 90; MacDonald 1994).

Although Goddard facilitated the definition of the LMW pattern of interaction as it is manifested in archaeological sites, because of its size, its richness of artifacts and exotic materials, it remains a unique site in the Maritime Peninsula. More than 30,000 tools, either produced by recent excavations or identified in private collections, have been attributed to Goddard. Over 90% of these are thought to originate in the LMW component, and an estimated 35% of these are from "exotic" sources (Bourque and Cox 1981: 4). This unparalleled productivity has led researchers to interpret Goddard as the nexus for a wide-ranging exchange network:

> *The relative frequency of exotics at the Goddard site is so much higher than on other components of any age in Maine that it may well have been a focal point in an extensive exchange network, particularly with populations to the north and east (Bourque 1994: 34-35).*

The interpretation of this evidence as a regional exchange network is loaded with implications. Exchange is one of a constellation of traits, which includes the greater division of labour, social stratification, increasing sedentism, and intensification of subsistence production. These traits are considered to be a hallmark of increasing social complexity (Brumfiel and Earle 1987; Earle 1982: 1):

> *Several patterns of lithic production systems appear to emerge relative to social organization and socioeconomic complexity. Generally, lithic production becomes more organized in structure, increases in size, volume, and efficiency in response to larger and more complex stone-tool-using populations (Ericsen 1984: 7).*

These associations have led researchers to search for wider evidence of increasing complexity, including the development of social differentiation and stratification. Sites such as Goddard and the Melanson site in Nova Scotia (Figure 5.1) are conjectured to be incipient villages, an implicit manifestation of increasing cultural complexity (Bourque 1994: 40-41; Bourque and Cox 1981; Nash 1990).

The Methodology of Regional Analyses

The major assumption underlying these studies is that "exotic" lithics can be identified and linked to a source:

> *Evidence for prehistoric exchange comes mainly from exotic lithics, which can now be distinguished from local lithic sources with confidence. Artifact morphology also aids in identifying artifacts originating outside the region (Bourque 1994: 23).*

The archaeological usage of the term "exotic" is at some variance with geological usage; archaeologists use it to refer specifically to lithic materials occurring on an archaeological site which do not naturally occur in the immediate vicinity of the site. Often implicit in this usage is the idea that these materials were culturally transported to the site. However, the natural or geological transport of materials is widely recognized (MacDonald 1994: 3). Based on this recognition, the sources of lithic raw material are differentiated as being from either primary (or proximal) geological sources, which include bedrock and outcrop sources, or from secondary (or distal) geological sources, which includes materials that have been moved some distance from the bedrock source by natural forces such as glaciers and stream action (Doyle 1995: 300; MacDonald 1994: 3).

The definition of lithic types relies on traditional geological categories of classification, such as "...mineral composition, grain size, texture and fabric, colour, luster, and hardness" (Doyle 1995: 299). The development of lithic types, or petrographic series (Black 1992; MacDonald 1994; Wilson 1983, 1991, 1994) is usually assemblage- or collection-based. These types are to a certain extent organized along the lines of geological genesis (i.e., volcanic, sedimentary, metamorphic), but are usually informed by a knowledge of source types, which are identified and characterized using samples from the source area by archaeologists and geologists (e.g., Doyle 1995: 308; Luedtke 1992; Polluck 1986).

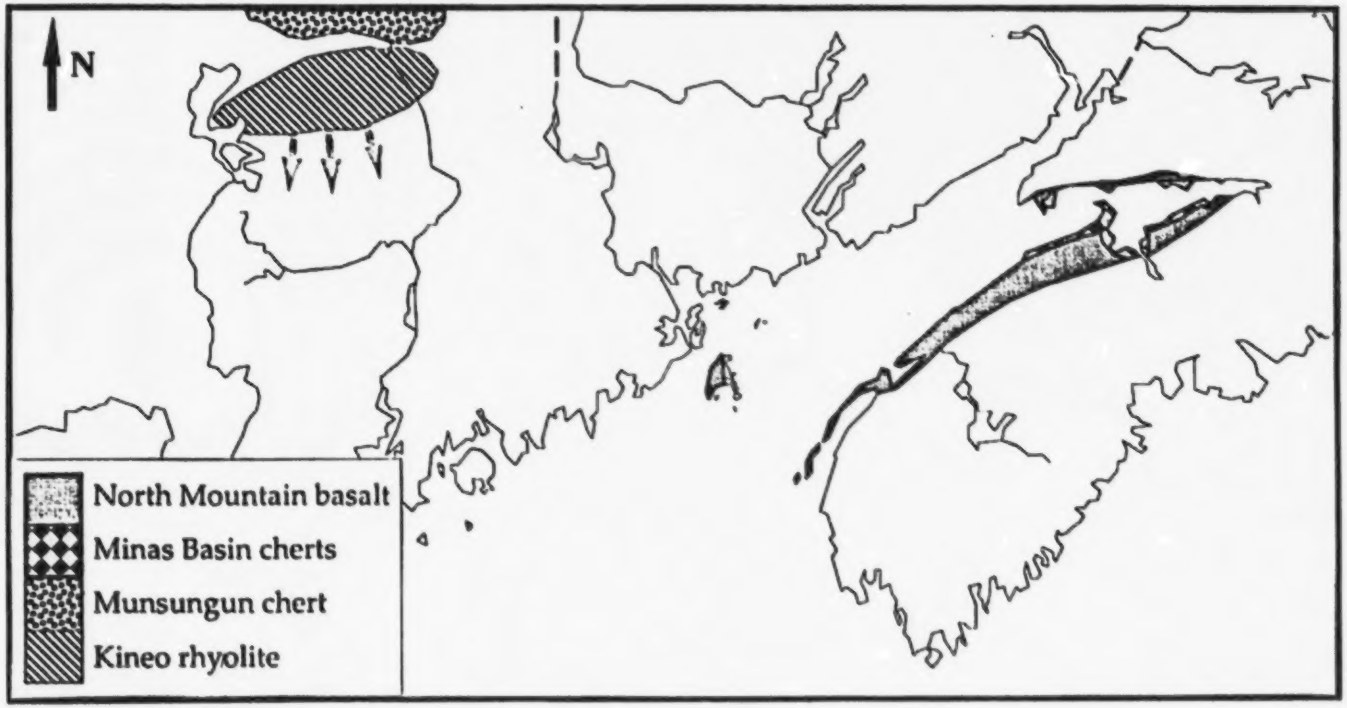
Although the discussion of "exotic" versus "local" lithics must be based in a site or region, there are several lithic types that appear so regularly on LMW sites throughout the Maine/Maritimes area that they are considered to be basic currencies of the LMW exchange network. These types are:

(i) Minas Basin Chert (MBC)
(ii) Munsungun-like Ordovician Mudstone (MUN), and
(iii) Mount Kineo/Traveler Rhyolite (KIN).

Minas Basin Chert (MBC)

Minas Basin is located on the Nova Scotian side of the head of the Bay of Fundy. The North Mountain basalt, a Triassic-age rift basalt extending along the northern margin of Nova Scotia, and around the Minas Basin (Figure 5.2), contains varicoloured cherts. These materials, when they occur on archaeological sites, are referred to by a variety of names, including Bay of Fundy chalcedony (Bourque and Cox 1981: 16; Sheldon 1991: 231), Scot's Bay jasper/chalcedony (Nash *et al.* 1991: 227), Nova Scotia chalcedony (Bourque 1994: 34; Doyle 1995: 306), and Minas Basin multicoloured chert (MacDonald 1994: 77). Minas Basin cherts (MBC) are resilicified volcanics. Although the genesis of cherts generally is complex and poorly understood (Luedtke 1992:16), MBC are considered to be deposited from "...slow-cooling, late magmatic stage, silicious exhalates that filled veins, fractures, and cavities in a Triassic-age rift basalt"

Figure 5.2: Source areas and bedrock for common exotic types in the LMW exchange network in the Maine/Maritimes area. The arrows represent glacial dispersal of material.


N
North Mountain basalt
Minas Basin cherts
Munsungun chert
Kineo rhyolite

(Doyle 1995: 308). Doyle (1995: 308) summarizes the macroscopic characteristics of MBC as follows:

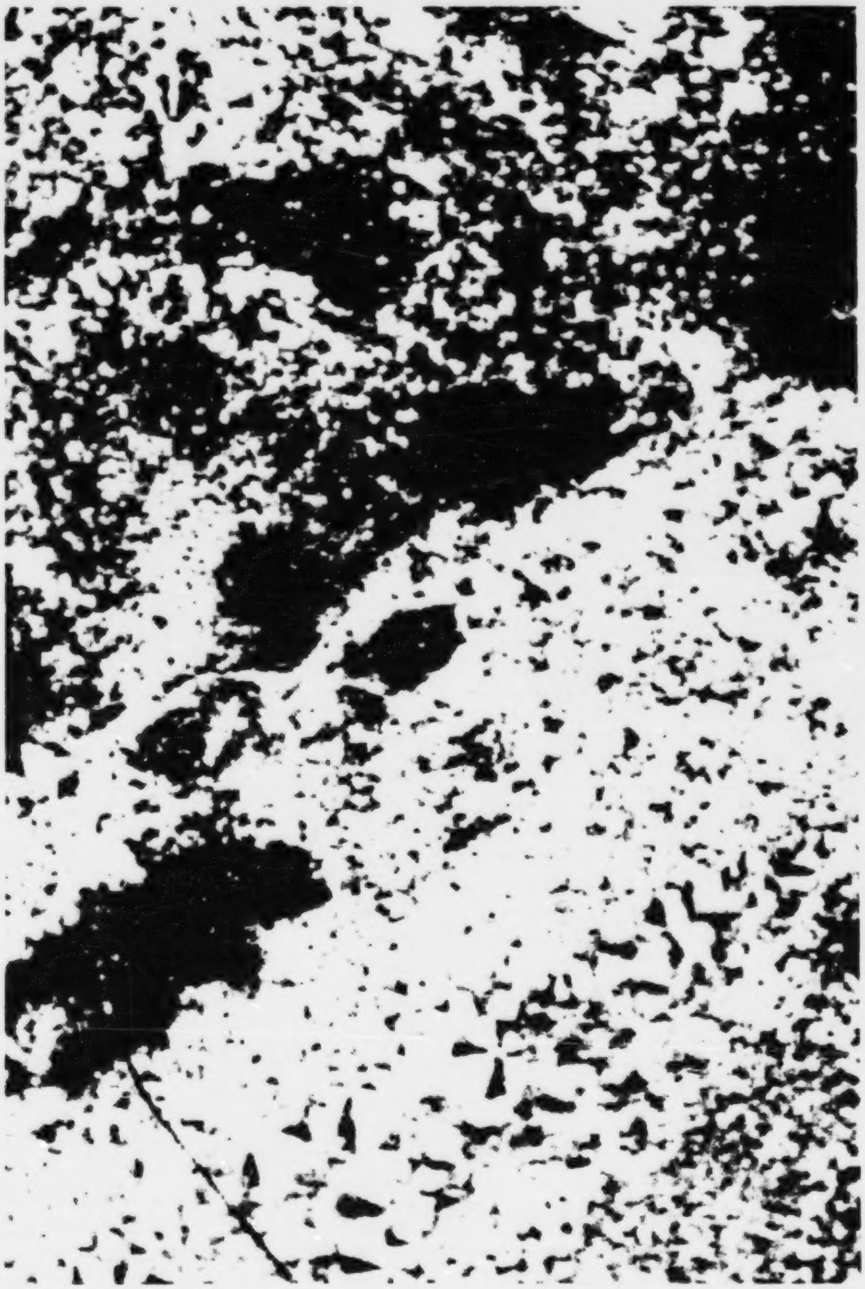
> *Both in outcrop and artifact the chalcedony/agate specimens are brightly coloured, translucent to transparent, generally have a glassy luster, and show both a brittle and weakly conchoidal fracture pattern. The glassy varieties occur in a wide range of colours: pink, rose, deep wine red, light and dark purple, as well as red-brown and dark red-brown. Textural habits include wavy banded, swirled, mottled, spotted, and layered. The chalcedony of Blomidon Point is different from the rest of the localities along the mountain. It has a dull luster, is opaque, and is often massive textured. Colours include pale pink, rose, and buff-violet... The mottled, swirled, dark wine red and purple, glassy chalcedony is quite common near and northeast of Digby. A yellow to pale orange-yellow moss agate was found on Moose Island, just east of Parrsboro.... There is also a weakly banded, dull to bright red to purple variety found in a few coastal artifacts that has been traced to Scots Cove...*

This indicates the wide variation in appearance that has been recorded for these cherts. The Minas Basin is considered to be a primary lithic source, although glacial transport of cobbles has not been entirely ruled out (MacDonald 1994: 161). However, it does not conform to a typical prehistoric lithic quarry, as the cherts are dispersed over a very large area (several hundred square kms), occur primarily as small cobbles and veins rather than substantial outcrops, and are more easily recovered intertidally than from within the actual basalt. As a result, patterns of quarry debitage, lithic extraction and production are poorly understood. Generally, archaeologists and geologists consider the basalts along the southwestern portion of the North Mountain to be barren of MBC, with the richest sources being in the area immediately around Minas Basin (Figure 5.2; Aumento 1966: 73).

It may be because of this distribution in Nova Scotia that archaeologists and geologists have expressed skepticism about the presence of similar cherts in the GMA. The North Mountain basalts outcrop along the western half of GMI (Figure 2.2, Figure 5.2), and although early geological reports had indicated that agate and chalcedony were present in these host rocks (Gesner 1981: 15; Sabina 1964: 11), recent explorations by archaeologists had failed to find any chert of a suitable size and quality for artifacts (Doyle 1995: 308). However, during the GMAP II, several small cobbles of high-grade chert were recovered from a non-archaeological context on the beach at Whale Cove.

There were two variants of Whale Cove chert: an extremely fine-grained mottled dark red translucent chert and an extremely fine-grained blue-white agate. Both variants were recovered as samples with portions of the host rock visible. Macroscopically, these two variants are different from the Minas Basin cherts that are usually encountered in archaeological collections. The coarser, stonier variants, the richly variegated moss-agates, and the mustard-yellow colour variants are significantly different from the Whale Cove specimens. Microscopic examination of thin-sections of the Whale Cove chert (Plate 5.1), however, reveal that they are indistinguishable from Minas Basin cherts, and that the host rock is a basalt.

Plate 5.1: *A thin-section of chert recovered from a secondary source (beach cobbles) in Whale Cove, Grand Manan (photo credit: Lucy Wilson).*



Munsungun-like Ordovician Mudstone (MUN)

The genesis and distribution of MUN is even less clear than those of MBC. A common lithic type on coastal Maine sites (Bourque and Cox 1981: 34; Doyle 1995: 306), MUN is considered to be from the Munsungun Lake Formation in northwestern Maine (Figure 5.2). As a result, it is often referred to in the archaeological literature as Munsungun chert (Bourque and Cox 1981: 34; Doyle 1995). In the Munsungun Lake Formation, this lithic type occurs in Ordovician "...dacitic submarine volcanic and volcanoclastic rock" (Doyle 1995: 306). Despite its volcanic source, the rock was slowly deposited in cycles in a sedimentary fashion; many specimens contain fossils, such as dark grey diatom spheres. Doyle (1995: 306) summarizes the macroscopic characteristics of MUN as follows:

> *... [Munsungun] chert occurs in a variety of colours, with deep wine red, dark green, and mottled red and green the most popular. Gray, dark gray, and occasionally black specimens are also present... It is a moderately fine-grained, massive textured chert, weakly translucent on thin edges, with excellent conchoidal fracture. Stress fractures are nearly absent (Doyle 1995: 306).*

Macroscopically similar mudstones have been recovered from deposits of Ordovician age from a number of places in the Maritime Peninsula. For example, Touladie-style "chert" from the Temiscouata Lake area of Québec is a black and grey mottled mudstone that falls into the potential range of variation of Munsungun Lake mudstone (Black, Wilson and MacDonald 1996; Burke 1996; MacDonald 1994: 142). A single cobble of black and grey MUN was recovered from a non-archaeological context (a beach) on the Bliss Islands in 1992; this suggests either a secondary source, or that similar Ordovician mudstones outcrop in or near the QR (MacDonald 1994: 142).

Kineo/Traveller Mountain Porphyry (KIN)

Kineo/Traveller Mountain Porphyry, or Mount Kineo rhyolite (KIN) is a common lithic material on coastal Maine sites. On these sites, it is considered a local material from a secondary source, as glacially-transported boulders of KIN occur in a broad band south of the bedrock source (Doyle 1995: 304; MacDonald 1994: 163). However, it is generally considered to be an "exotic" in New Brunswick and Nova Scotia (Black, Wilson and MacDonald 1996; Cox 1995: pers. comm. to D. Black; MacDonald 1994: 163). The primary source of KIN is a rhyolite belt of caldera centres in the Traveller Mountain and Kineo Mountain area of central Maine (Figure 5.2). KIN is macroscopically distinctive, with a green-grey groundmass containing small beads of glassy quartz, and rectangular phenocrysts of feldspar (Doyle 1995: 304; MacDonald 1994: 163). The quartz beads are unusual, and aid in the identification of the lithic type (Wilson 1996: pers. comm.). Other accessory minerals are often present which may allow for the sourcing samples to specific caldera (Doyle 1995: 304).

Other exotic lithic materials

As indicated above, a variety of other distinctive exotics also occur on sites in the Maine/Maritimes area, but in very low quantities. None of these materials have been securely identified in collections and assemblages from the GMA, so discussion of them will be limited. These materials include Ramah Bay quartzite (northern Labrador), Mistassini quartzite (northern Québec), Onondaga chert (southern Ontario and New York state), and Cheshire quartzite (northwestern Vermont) (Bourque 1994: 34). For a more complete description of these lithic types, see Doyle (1995).

Discussion

Exotic lithic materials have been identified on many LMW period sites throughout the Maine/Maritimes area. However, the quantities and specific lithic types appear to differ regionally. In the QR, Minas Basin cherts are often present in LMW assemblages. Munsungun-like Ordovician mudstones, on the other hand, are significantly less common than in the CCM (Black, Wilson and MacDonald 1996). Mount Kineo/Traveller rhyolite, a local volcanic common in the CCM, is represented by only 1 identified sample in the QR (Black, Wilson and MacDonald 1996). Furthermore, Ramah Bay quartzite has not been recorded from any LMW component in the QR (Black, Wilson and MacDonald 1996). In Nova Scotia, exotic lithics occur on LMW sites (e.g., the Brown and Melanson sites) primarily in the form of large quantities Minas Basin chert (Nash 1990; Sheldon 1988, 1991). Ramah Bay quartzite occasionally appears on these sites (Sheldon 1991), while typical CCM lithics such as Munsungun-like Ordovician mudstone and Mount Kineo/Traveller rhyolite apparently are absent.

These regional comparisons are hampered by variations in how assemblages are reported and types are described. Some researchers restrict petrographic analysis to artifacts (e.g., Bourque and Cox 1981: 14; Crotts 1984), while others incorporate debitage (Black 1992; MacDonald 1994; Sheldon 1988: 81). Frequently, piece count is the method of quantification, although some researchers have pointed out the increased utility of weighing types and samples (Black 1992; MacDonald 1994). The determining factor in the quality and quantity of reporting may be the size of the assemblage. Indeed, thin-sectioning and extensive debitage analysis would be an overwhelming task for a site the size of Goddard.

The presence of high-quality chert on Grand Manan is another complicating factor in regional analyses. The assumption that all fine-grained, translucent, brightly coloured cherts on LWM sites are from the Minas Basin area of Nova Scotia is no longer tenable. Comparable problems with the identification of all fine-grained red, green and black mudstones as Munsungun cherts (MacDonald 1994: 142) suggests that the foundations upon which interpretations of regional exchange are based, identified "exotic" types from known sources, remain to be firmly established.

PETROGRAPHIC ANALYSIS OF THE GRAND MANAN ASSEMBLAGE

From the discussion of site structure and settlement, it is clear that the composition and structure of the Newton's Point site are similar to those of other regional LMW sites. Furthermore, the radiocarbon date and artifacts indicate that Newton's Point was occupied at a time when people living there could have participated in regional exchange networks and interaction. As discussed above, LMW interaction in the Maine/Maritimes area is manifested in lithic materials. The lithic assemblages of the GMA, however, suggest further complications in the analysis of regional exchange. In this section, the lithic materials analysis is presented, and some of these issues are addressed.

The Grand Manan Petrographic Series (GMPS)

The initial analysis of the flaked lithic assemblages from the GMA involved the development the Grand Manan Petrographic Series (GMPS) to establish which lithic types are present. The GMPS includes all flaked lithic specimens from Newton's Point (BeDq-11), the Baird site (BdDq-3), Indian Camp Point (BeDq-12), and Kent Island (BdDq-6).

The GMPS was constructed using a methodology for sorting and hand specimen identification developed by Black (1995 pers. comm.) and McDonald (1994) in the analysis of the Bliss Islands Archaeological Project lithic assemblages. The initial assessment of the GMA lithics was conducted with the assistance of L. Wilson, an archaeological geologist, and D. Black, a geoarchaeologist. L. Wilson also provided a great deal of expertise and technical assistance with all aspects of the thin-section analysis. The thin-sections themselves were masterfully prepared by D. Pirie of the University of New Brunswick geology department.

The type collection for the GMPS was presented during a lithic sourcing workshop at the Canadian Archaeological Association conference in 1996, where further input from archaeologists and geologists was obtained. Examination of the lithic assemblages (stone tools and debitage) from the GMA resulted in the recognition of 65 individual types (Appendix C). The types were determined through macroscopic (hand specimen) examination, assisted by low-power (10X to 20X) magnification. The following criteria were used: grain-size (extremely fine-grained to coarse), texture (glassy, massive, stoney), colour (both of the groundmass and inclusions), fracture (conchoidal to blocky), translucency (transparent to opaque), mineral composition (the presence of small crystals, minerals, and phenocrysts) and other inclusions or veins, patterns of weathering and bleaching, character of the cortex, and other clues to its genesis (relict flow-banding, bedding planes, fragments of host rock). In cases where further information was needed (either for the purposes of sourcing or classification), specimens were thin-sectioned. Initally, the purpose for thin-sectioning was to obtain verification of the macroscopic (hand specimen) identification of a GMPS type as one of the identified exotic types discussed above (in particular, either MBC or MUN). In all, 11 specimens where thin-sectioned and examined using a petrographic microscope. However, in 10 of the 11 cases, the thin-section demonstrated that the specimen was not one of the recognized exotic types, despite its macroscopic similarity (see discussion, below).

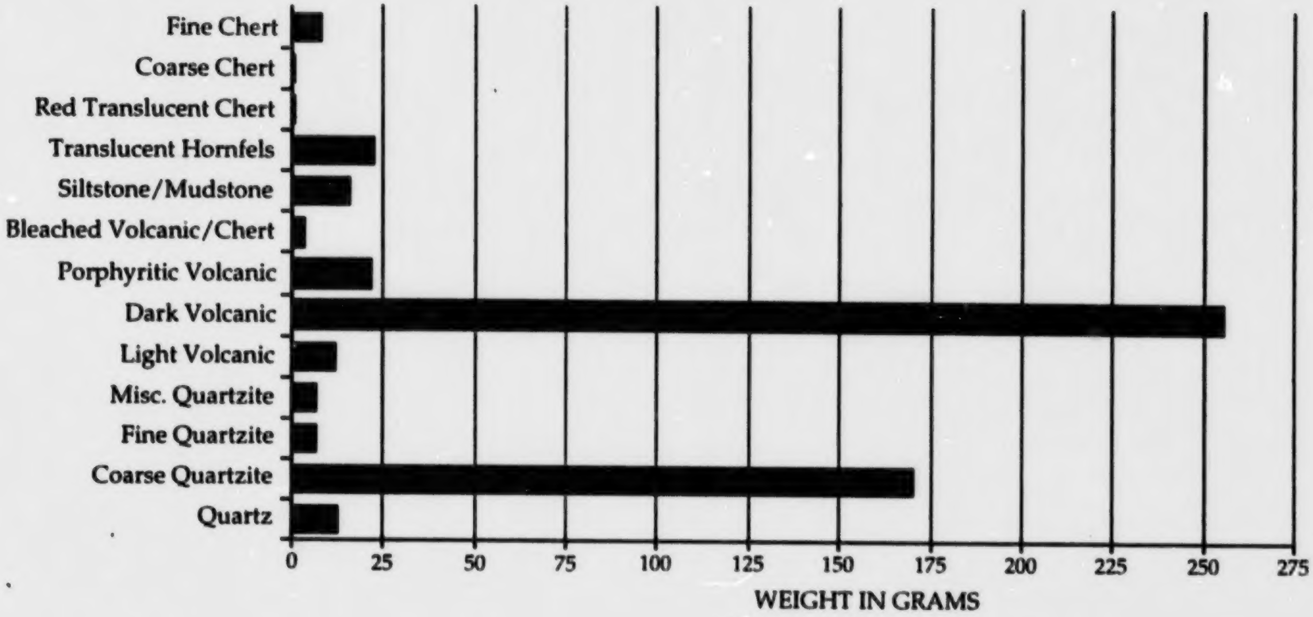
A total of 1041 flaked lithic specimens were typed from Newton's Point (BeDq-11), while 242 flaked lithic specimens were typed from the Baird site. The Indian Camp Point site (BeDq-12), with a total lithic assemblage of 12 specimens, and the Kent Island site (BdDq-6), represented by 2 lithic artifacts, are not included in this analysis, due to small sampling size. The 65 GM types are organized hierarchically into 15 lithic classes, which are grouped into 7 categories (Table 5.3). The 7 categories are based on geological (genetic) origins, while lithic classes reflect common macroscopic features shared between individual types. Ideally, the individual types represent materials from distinct sources, however, the thin-sectioning has demonstrated that caution must be applied to hand specimen identification of even distinctive types. Factors such as bleaching, weathering, and variation within a lithic source on one hand, and superfical similarities between otherwise different materials on the other hand, are confounding problems that must be considered.

The varied nature of the bedrock geology of the GMA allows for a wide range of materials. Potentially, all 65 GM types could be acquired locally, although specific sources were not located for many of them during the GMAP II. However, in addition to the Whale Cove cherts, tool-grade quartz, coarse quartzite, and a variety of felsic and mafic volcanics were recovered from the beaches of the GMA. These local materials likely constitute the bulk of the lithics from both sites. Figures 5.3 and 5.4 present the quantity of material in each petrographic class for the Baird site and the Newton's Point site. Although definitely local materials dominate both (in particular, coarse quartzites and

Table 5.3: Lithic classes in the Grand Manan Petrographic Series.

Genetic category	*Lithic class*	*Types*
Metamorphic	Coarse Quartzite (CQ)	GM04, GM05, GM06, GM07, GM54
	Fine Quartzite (FQ)	GM08, GM52, GM53, GM55
	Misc. Quartzite (MQ)	GM18, GM43, GM47
Sedimentary	Siltstones & Mudstones (SM)	GM14, GM40, GM50
Volcanic	Light-coloured Volcanic (LV)	GM09, GM10, GM11, GM15, GM30, GM31, GM32, GM35, GM36, GM38, GM39, GM41, GM58, GM62, GM64
	Dark-coloured Volcanic (DV)	GM33, GM34, GM49, GM57, GM59, GM60, GM63
	Porphyritic Volcanic (PV)	GM27, GM42, GM56, GM61
Volcanic or Chert	Bleached Volc. or Chert (BVC)	GM26, GM28, GM29, GM37, GM45, GM46, GM48
Chert	Translucent Hornfels (TH)	GM51
	Red Translucent Chert (RTC)	GM12, GM65
	Mottled Red-Brown Chert (MRBC)	GM19
	Coarse Chert (CC)	GM22, GM23, GM24, GM25
	Miscellaneous Fine Chert (FC)	GM13, GM20, GM21, GM44
Quartz	Quartz (QTZ)	GM01, GM02, GM03, GM16
Miscellaneous	Miscellaneous (M)	GM17

Figure 5.3: Lithic classes by weight (in grams) from the Baird site (BdDq-3).



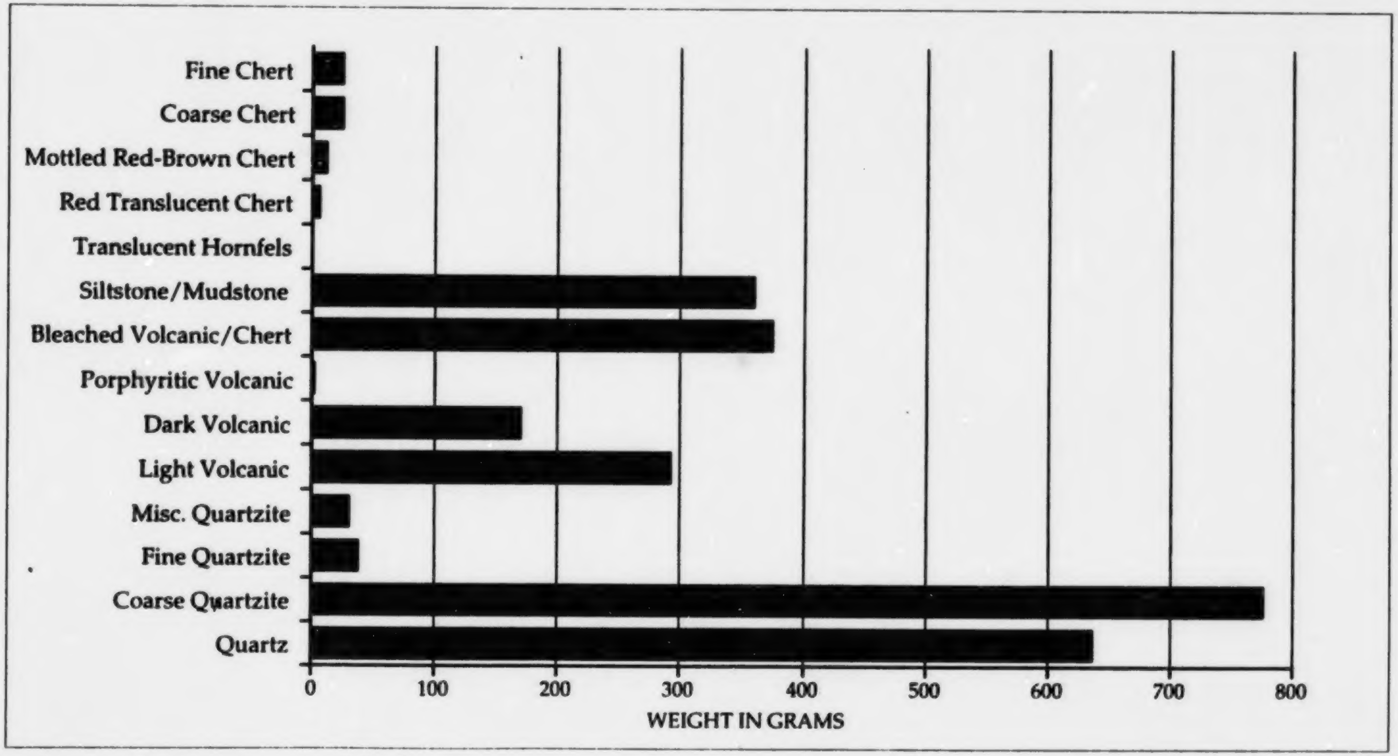


Figure 5.4: Lithic classes by weight (in grams) from the Newton's Point site (BeDq11). (Note: the class "Siltstone or Mudstone" is well-represented at Newton's Point because of a single large core recovered from the beach immediately in front of the site).

various volcanics), the Newton's Point and Baird site assemblages are significantly different from one another. Figure 5.5 demonstrates the small proportion of individual GM types that are common to both assemblages. Only 14 of the 65 lithic types were represented in both the Baird site and the Newton's Point lithic assemblages. Of these shared types, there were 3 coarse quartzites (GM04, GM06, GM07), 1 miscellaneous quartzite (GM47), 1 siltstone or mudstone (GM14), 1 dark-coloured volcanic (GM33), 2 bleached volcanics or cherts (GM29, GM37) 4 cherts (GM12, GM51, GM25, GM21), and 2 quartzes (GM01, GM03) (see Appendix C for a description of each lithic type). These differences extend beyond individual types to the lithic class and genetic category level. Figures 5.6 and 5.7 show the proportions of volcanic, quartz, metamorphic and chert for the Newton's Point and Baird sites, respectively. Volcanics are well-represented at Newton's Point (64% of assemblage), whereas quartzite and chert are the most significant classes at the Baird site (71% of assemblage). These variations may be the result of either functional or temporal differences, but indicate the localized nature of patterns of lithic material use. They also suggest that lithic sources in the immediate site area (micro-local sources), either as primary sources (bedrock outcrops) or secondary sources (beach cobbles) may be important considerations for site location and function.

Potentially "exotic" lithics in the GMA

During the classification of the GMA lithic assemblages, resemblances to types from the QR and the CCM were noted. In most cases, the identified petrographic types are similar to materials from local primary and secondary sources within the GMA. However

Figure 5.5: The proportion of shared vs. different lithic types between the Newton's Point and the Baird sites. The bars represent the proportion of the total assemblage by weight.

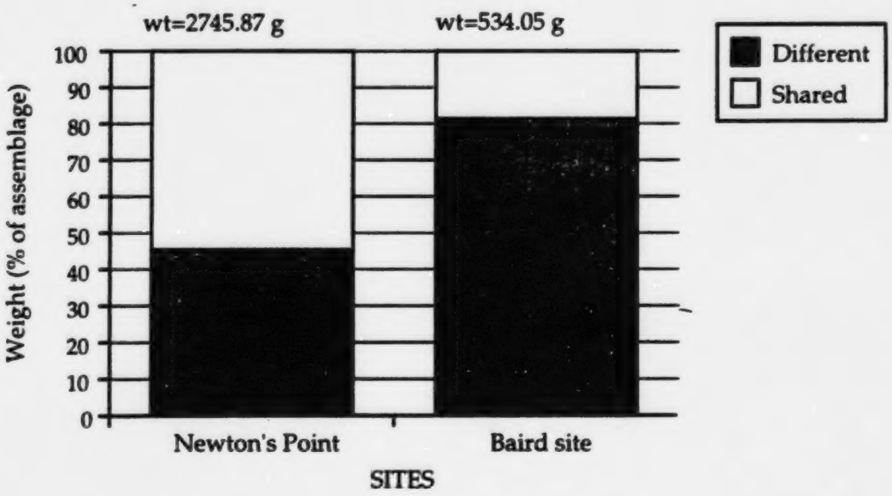


Figure 5.6: The composition of the Newton's Point lithic assemblage, according to general genetic category.

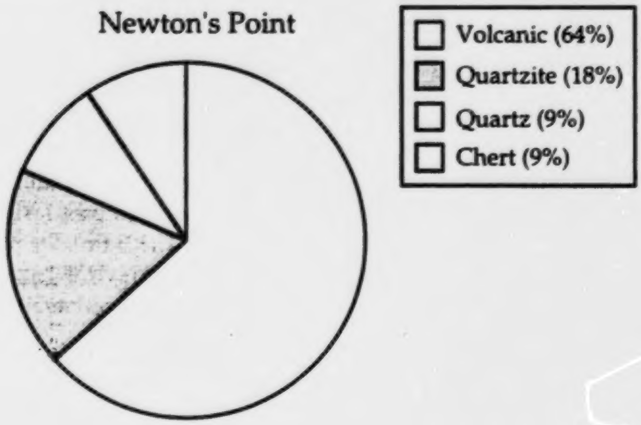
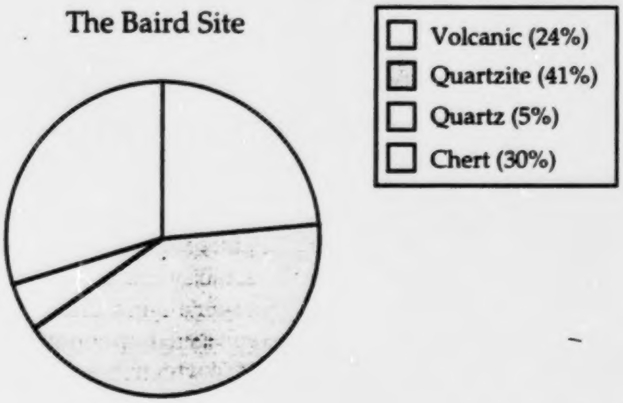


Figure 5.7: The composition of the Baird site lithic assemblage, according to general genetic category.



some GM types are macroscopically similar to geological samples from "exotic" sources (see Table 5.4). The potentially exotic materials in the GMA lithic assemblages are similar to Minas Basin chert (MBC), Munsungun-like Ordovician Mudstone (MUN), and Mount Kineo/Traveler Rhyolite (KIN).

Based on the macroscopic examination of specimens, 8 lithic types fell within the expected range of variation of MBC (L. Wilson 1996: pers. comm). Of these, 6 types could be described as multicoloured, red to translucent mottled chert (GM12, GM13, GM22, GM23, GM25 and GM65). Some of these types were extremely fine-grained, while others were very coarse and heterogeneous. These specimens consisted of 39 flakes (wt = 59.15 g) from Newton's Point (BeDq-11), and 4 flakes (wt = 1.3 g) from the Baird site (BdDq-3). A flake of GM12 was thin-sectioned; the sectioned sample was a silicified volcanic hosted in basalt, as are both MBC and the Whale Cove chert. However, these specimens were macroscopically dissimilar to the archaeologically recognized MBC variant in subtle ways. The red translucent Whale Cove chert is macroscopically more similar to the more fine-grained examples from the GMA assemblages.

The remaining 2 lithic types with MBC characteristics were GM19 and GM51. Unlike the above specimens, however, these types exhibited some macroscopic similarities to MBC, but in thin-section are not similar at all. GM19 is a mottled dark to light purple-brown chert; macroscopically this type is within the expected range of variation for MBC, and is remarkably similar to some hand specimens from the Minas Basin. However, the thin-section reveals that this is a silicified sedimentary rock, possibly a silicified limestone. Only five pieces (10.8 g) of this material were recovered, all from Newton's Point. GM51 is white to translucent to transparent chert containing clear glassy patches; it ranges from an extremely fine-grained, glassy rock to a coarser, more opaque rock with patches and veins of brown to black minerals. Superficially, some of the finer-grained samples were macroscopically similar to some MBCs. Three specimens were thin-sectioned, revealing that they are silicified metamorphic rocks containing chlorite. Based on the microscopic examination of the thin-sections, this type was designated a "hornfels". The Baird site produced 50 flakes (wt = 21.85 g) of GM51, while only one flake (wt = 0.9 g) was recovered from Newton's Point.

Three GM types fell into the expected range of variation of MUN: GM14, GM15, GM50. Two of the types, GM14 and GM15 are macroscopically like "exotic" mudstones (MUN). However, thin-sections revealed them to be volcanics. GM 14 is an extremely fine-grained dark red rock, with flat, white planes running through it. Four specimens (wt = 356.9 g) from Newton's Point, and 2 (wt = 0.7g) from the Baird site were recovered. A large specimen (possibly a beach-rolled core) was recovered from immediately in front of the erosional face, and thin-sectioned. Macroscopically, this specimen is similar to archaeological- and bedrock-derived specimens of MUN. However, the thin-sectioned specimen contained very small plagioclase grains, calcite clusters, and was slightly banded. These characteristics indicate that this specimen is a volcanic (possibly of basaltic origin), and *not* a mudstone. This was confirmed by comparing the thin-section of GM14 with thin-sections of mudstones from the Munsungun Lake source.

GM15 is a grey to black mottled chert, with fine crosscutting veins of quartz crystal. These specimens are macroscopically similar to Touladie chert, an Ordovician silicified mudstone similar to MUN that outcrops in the Lake Temiscouata area of Québec (Chalifoux and Burke 1995). However, the specimen that was thin-sectioned is an extremely fine-grained dacite or rhyolite, and *not* a mudstone. The section revealed a slightly fibrous texture, with long, thin feldspars, and some very fine biotite, muscovite and micas. Although no pieces were recovered from the Baird site, Newton's Point produced 78 specimens (wt = 54.8 g).

GM50 is a very fine-grained, homogenous green-grey mudstone. Although the thin-sectioned specimen is a shale or a mudstone, it is different from MUN in both hand specimen and thin-section. The thin-section of GM50 reveals that it contains detrital quartz grains and fine silica, but lacks fossils. A single core of GM50 was recovered from the Baird site (wt = 15.1 g).

A single extensively weathered flake of what is possibly KIN was recovered from the Baird site and designated GM61. It is a very fine-grained, mottled, grey-green volcanic, with clear glassy crystals. The groundmass is slightly translucent and contained small white, and occasionally empty patches or pits. Unfortunately, the single flake was too small (0.4 g) to confirm with any confidence that it is KIN.

No specimens were recovered from the GMA that could fall into the expected range of variation for any of the other typical LMW "exotics", such as Ramah Bay quartzite, Mistassini quartzite, and Onondaga chert.

Problems with petrographic analysis

As a part of the process of refining the GMPS, the type collection was presented to several archaeologists and geologists with regional experience with lithic assemblages. These various contributions revealed that two approaches can be used to assign individual lithic specimens to a specific source. The geological approach involves delimiting the *expected range of variation* for a given source, then assigning the specimen to probable sources from that type of host or parent rock. The archaeological approach, and that traditionally employed in lithic sourcing exercises in the Maine/Maritimes area, involves characterizing an *archaeologically recognized type* using collections and assemblages of flaked lithics and then attempting to physically locate a corresponding bedrock source. Obviously these two approaches can produce very different results. Understanding the difference between them is salient to the discussion of the GMPS, as many lithic specimens from the GMA fall on the peripheries of archaeologically recognized types, while remaining within the expected ranges of variation for probable sources. Furthermore, archaeologists recognize a number of very specific locales as sources, even though the host rock or source bedrock outcrops over a much wider area (e.g., Minas Basin cherts and the North Mountain basalt, Figure 5.2). However, while the geological approach is more methodologically rigorous, it also tends to be inflexible. What may be considered a geologically insignificant variation may be highly significant to archaeologists. For example, Whale Cove chert is microscopically identical to MBC. However, macroscopically it is different from archaeologically recognized variants.

The macroscopic or hand specimen assessment of the GMPS suggests that as much as 18% of the Newton's Point lithic material, and 5% of the Baird site lithic material originated from exotic sources (see Table 5.4). However, despite the presence of these potentially exotic materials in GMA assemblages, in almost all cases direct assignment to an exotic source was impeded by some facet of the analysis. These impediments were not necessarily the result of the analytical methods employed, but stem more directly from the wide range of materials

***Table 5.4:** The percentage of lithic material (by weight in grams) from Newton's Point and the Baird site that could be assigned to exotic sources based on macroscopic attributes, and their actual sources, as determined by thin-section.*

Potential exotic type	GMPS Types (macroscopic identification)	Newton's Pt. wt (gm)	Newton's Pt. %	Baird site wt(gm)	Baird site %	Actual suggested source
MBC	Multicoloured mottled cherts (GM12, GM13, GM22, GM23, GM25, GM26)	59.15	2%	1.3	<1%	Possibly Minas Basin or Whale Cove?
	Mottled red-brown chert (GM19)	10.8	<1%	0	--	unknown; a silicified limestone
	Translucent "hornfels" (GM51)	0.9	<1%	21.85	4%	unknown; a silicified metamorphic
	TOTAL MBC-like	70.85	3%	23.15	4%	
MUN	Red "mudstone" (GM14)	356.9	13%	0.7	<1%	unknown; a volcanic
	Black and grey "mudstone" (GM15)	54.8	2%	0	--	unknown; a volcanic
	TOTAL MUN-like	411.7	15%	0.7	<1%	
KIN	Bleached porphyritic volcanic (GM61)	0	--	0.4	<1%	possibly Mt. Kineo
	TOTAL POTENTIALLY EXOTIC LITHICS	482.55	18%	24.25	5%	

present in the GMPS, and the reliance on macroscopic identification and classification schemes in traditional studies of lithic artifacts.

The petrographic analysis of potentially "exotic" materials demonstrates that using macroscopic identification alone to assign rocks to a source is insufficient and potentially misleading. The range of macroscopic appearance of rocks of all types, even those of completely different genetic origins, is not appreciated. These issues are so problematic that thin-sectioning is not an adequate control. It is a very destructive method of examination, and only informs the researcher about the specific piece that was thin-sectioned. The extrapolation of the results gained from sectioning to all macroscopically similar specimens within an assemblage is as fraught with peril as extrapolating a single source for all macroscopically similar rocks. As geophysical and geochemical techniques, such as X-ray florescence, neutron activation and trace element analysis, become more refined and available (e.g., Burke 1996), advances in the study of lithic sources may occur that will circumvent some of these problems.

Furthermore, the identification of potentially exotic lithic materials can be pursued without resorting to the traditional materials/source analyses. As a reductive technology, lithic production leaves evidence in the form of debitage. Debitage analysis reveals patterns of lithic reduction and assists with the identification of stages of tool production. These in turn may suggest the presence of exchange activity. To gain a further understanding of the potential role of the GMA in regional interaction, debitage analysis was performed on the Newton's Point (BeDq-11) and the Baird site (BdDq-3) lithic assemblages.

Lithic reduction and tool index

Although lithic reduction analyses are not routinely performed on assemblages in the Maine/Maritimes area, they have made significant contributions to the study of lithic exchange systems elsewhere (e.g., Ericsen and Purdy 1984; Morrow and Jefferies 1989). Lithic reduction sequences (as determined through debitage analysis), and the system that develops within a culture to procure and exchange lithic materials are closely related. Ericsen (1984:3) describes this relationship as follows:

> *A lithic production system can be defined for purposes of discussion as the total synchronous activities and locations involved in the utilization and modification of a single source-specific lithic material for stone-tool manufacture and use in a larger social system. Production is seen as a process of material modification with intent to form a particular object. During the course of the many stages of production of the material, debitage will be created at the sites of production, which will be indicative of the stages of production. Debitage analysis is a basic technique used in the reconstruction of a lithic production system.*

The assumption underlying this approach is that lithic materials are frequently traded as partially reduced but unfinished artifacts such as modified cores, blanks, and preforms (Morrow and Jefferies 1989: 30). The production of these more portable units of modified raw materials (the initial modification of which is assumed to take place near or at the material source), and their subsequent reduction into finished artifacts (which is assumed to take place near or at the material's destination), both produce diagnostic patterns of debitage. By quantifying various kinds of debitage, it is possible to infer whether particular materials were brought to the site as unmodified pieces of tool-stone (suggesting a local source), or was roughed out elsewhere, and brought to the site for finishing (suggesting a more distant source).

Although flaked stone tools encompass retouched flakes, flakes modified by steep edge retouch into scrapers, and blade technology, bifacially flaked tools, such as bifacial knives, awls, gravers and projectile points produce the largest quantities of debitage, and are thus the focus of debitage analysis. Furthermore, evidence from the GMA suggests that biface production was the significant activity at the sites examined during the GMAP II. In the manufacture of a bifacial tool, a piece of tool-stone is methodically reduced to the desired finished product. During this reduction process, progressively different kinds of debitage are produced. For the purposes of the GMA debitage analysis, three stages of reduction, resulting in the production of 7 types of flakes were identified (Table 5.5).

Initial, or primary reduction, resulting in decortication flakes (DCT) and core reduction flakes (CRF), occurs when a core is first modified and reduced for the production of with flakes on which bifaces can be manufactured, or to shape the core itself into a biface blank. Maritime Woodland bifaces are usually significantly worked during manufacture, so attributes that might suggest whether cores or flakes were being used (such as striking platforms) are usually absent. However, the small size of LMW bifaces, the presence of bifacial cores and the presence of unmodified primary debitage suggests the use of flakes for bifaces.

The initial stages of the reduction process may also result in the production of blocks and shatter (BAS), angular pieces of broken rock

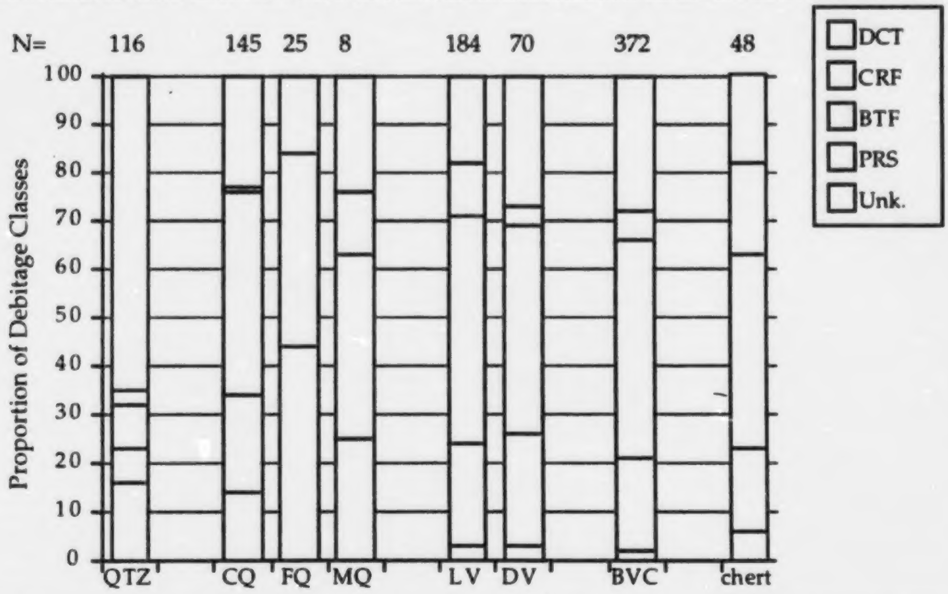
Table 5.5: Lithic reduction sequences identified during the GMA debitage analysis.

Reduction	*Flake type*	*Characteristics*
Primary	Decortication (DCT)	At least 10% of dorsal surface is cortical
	Core Reduction (CRF)	Smooth striking platform, with an angle between 80° and 100° from ventral surface
Secondary	Biface Thinning (BTF)	Faceted striking platform, with an angle greater than 100° from ventral surface
Tertiary	Pressure (PRS)	Small size, thin, very small striking platform, often twisted
		Very small size, angled striking platform
Unknown	Retouch (RTF) Block/Shatter (BAS) Unknown (UNK)	Lacking some or all flake characteristics, such as striking platform, ventral and dorsal surface, etc... Exhibit most flake characteristics, but lacking the diagnostic element (striking platform), usually due to breakage

that lack some or all of the typical flake characteristics, thus defying further categorization. The blank is modified using secondary reduction, producing biface thinning flakes (BTF). This activity may result in the creation of preforms (completely shaped artifacts which require edge trimming or the addition of final elements such as stems or notches). The manufacturing of the finished product involves tertiary reduction, which generates pressure flakes (PRS) and retouch flakes (RTF). Pressure and retouch flakes can also be created during the use and resharpening of stone tools, and so may indicate subsistence-related activity. At all stages of reduction, the flakes may be broken, either during reduction, or after they have been discarded (either by trampling or ground pressure). Elements that exhibit some flake characteristics, such as ventral and dorsal surfaces, but lack diagnostic striking platforms or other features are assigned to an"unknown" (UNK) class.

The premise of debitage analysis is that the presence of quantities of primary and secondary debitage of a particular lithic material indicates that it was brought to the site in a relatively unfinished form, suggesting that the source of the material is nearby. Conversely, the absence of tertiary debitage may point to the manufacture of blanks or preforms, suggesting that the material was being prepared for transport and that final finishing occurred elsewhere. However, the absence of primary debitage and substantial quantities tertiary debitage suggests that only the final stages of artifact manufacture and/or use of the artifacts took place at the site, as

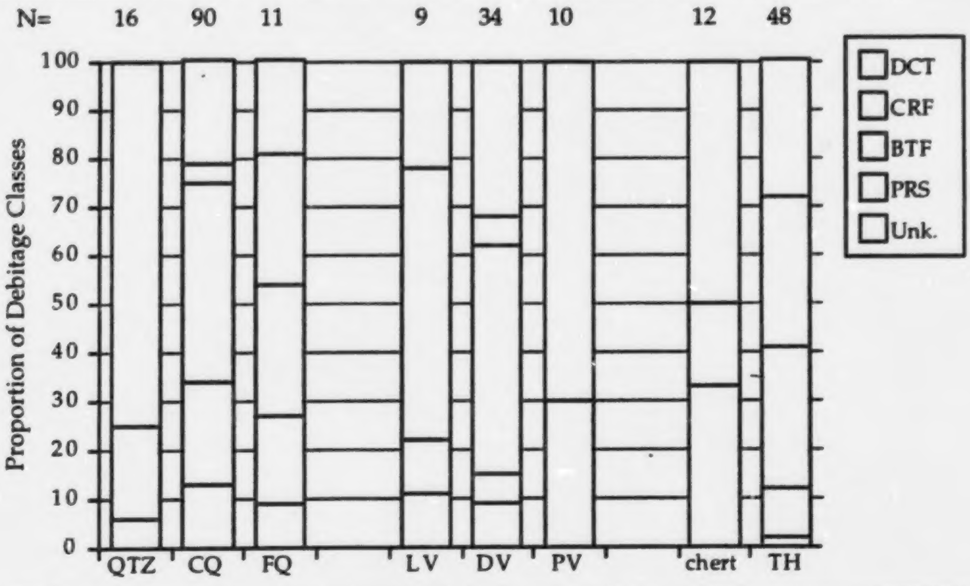
Figure 5.8: Proportion of debitage classes by lithic material classes for the Newton's Point site. Only classes with more than 5 pieces of debitage are presented. See Table 5.3 for descriptions of the lithic classes (Note that the "chert" classes (CC, FC, RTC, TH, and MRBC) have been combined).



would occur when finished or nearly finished artifacts were brought to the site. This latter situation might indicate that the materials involved were brought from a distance.

The debitage from the Newton's Point and Baird sites was analysed according to the lithic classes established in the GMPS (see Table 5.3). As indicated by Figures 5.8 and 5.9, there are significant differences between the Newton's Point and the Baird site assemblages. Small sample size (particularly in the case of the Baird site), may account for some of these differences. From Newton's Point, large quantities of primary and secondary reduction debitage were found of the quartz (QTZ) and quartzite (CQ, FQ and MQ) classes. Indeed, a wide variety of these materials are available as beach cobbles and in local bedrock sources. The pattern for the coarse quartzite (CQ) and quartz (QTZ) from the Baird site is similar. However, significantly higher proportions of fine quartzite (FQ) tertiary debitage were recovered from the Baird site, suggesting that some of these quartzites may not be from local sources. Volcanic materials (LV, DV, and BVC) from both Newton's Point and the Baird site have relatively higher proportions of secondary and tertiary debitage than quartzites, although the Baird volcanics are represented by slightly higher quantities of primary and secondary reduction than those of Newton's Point. This may reflect the relative importance of local volcanics. In both assemblages, the cherts and fine-grained hornfels (TH)exhibit higher proportions of

Figure 5.9: Proportion of debitage classes by lithic material classes for the Baird site. Only classes with more than 5 pieces of debitage are presented. See Table 5.3 for descriptions of the lithic classes (Note that all of the "chert" classes (CC, FC, RTC, and MRBC) except TH have been combined).



secondary and tertiary reduction, indicating that at least some of these types may be derived from non-local sources or represent patterns of use and curation.

In addition to the classification of debitage, the ratio of artifacts (formal tools) to debitage (tool index) was calculated. A high tool index (presented in Table 5.6 as a percentage of total pieces) may also suggest that most of the reduction took place elsewhere. The proportion of utilized flakes to the total assemblage is also presented in this table (utilization index), although the lower level of recognition of utilized edges in coarser, more granular materials, and the arbitrary nature of flake utilization diminishes

***Table 5.6:** Table showing the ratio of artifacts to debitage (tool index) and utilized flakes to debitage (utilization index), for the major lithic classes in the GMPS. (N.B.: Although the site totals represent all flaked lithic material, only those lithic classes containing five or more total pieces are presented).*

		# of pieces			Indices	
Class	*Pieces*	*Tool*	*Util.*	*Deb.*	*Tool*	*Util.*
BeDq11						
QTZ	131	2	2	127	1.5	1.5
CQ	154	3	3	148	1.9	1.9
FQ	29	4	0	25	13.8	0
MQ	9	0	0	9	0	0
LV	194	6	5	183	3.1	2.5
DV	76	5	2	69	6.6	2.6
BVC	382	9	7	366	2.3	1.8
SM	6	0	0	6	0	0
CC	24	2	0	22	8.3	0
FC	13	2	2	9	15.4	15.4
RTC	14	1	0	13	7.1	0
MRBC	5	3	1	1	60.0	16.7
subtotal	1040	37	22	983	3.5	2.1
BdDq3						
QTZ	16	0	0	16	0	0
CQ	90	0	9	81	0	11.1
FQ	11	0	1	10	0	9.1
LV	9	0	4	5	0	44.4
DV	35	1	4	30	2.8	11.4
PV	10	1	1	8	10.0	10.0
BVC	5	1	0	4	20.0	0
FC	8	0	1	7	0	12.5
TH	50	2	2	46	4.0	4.0
subtotal	242		22	215	2.1	9.1

its value as an index of exchange. Although a series of ratios and indices have been proposed for these types of analyses (Ericsen 1984: 4), many of them were redundant on the proportional analysis of lithic debitage types.

As in the reduction analysis, significant differences in the tool and utilization indices can be noted between the Baird site and the Newton's Point site. Again, small sample sizes may be responsible for some of these differences. On Newton's Point, mottled red-brown chert (MRBC) displayed the highest tool index by a wide margin (60.0). Fine cherts (FC), fine quartzites (FQ), coarse cherts (CC), red translucent cherts (RTC), and dark volcanics (DV) all display relatively high values (between 16.0 and 5.0). Materials such as quartz (QTZ), coarse quartzites (CQ), light-coloured volcanics (LV), and bleached volcanics or cherts (BVC) all display low values (less than 5), which corresponds well with the reduction analysis; the presence of these materials as cobbles on beaches in the GMA corroborates the utility of this index for identifying patterns of local material use. The Baird site produced few formal tools, so that the tool index is lower than that of the Newton's Point on the whole, and tool indices for lithic classes are more easily skewed by the occurrence of single artifacts. Relatively high values (10.0 to 20.0) for porphyritic volcanics (PV) and bleached volcanics or cherts (BVC) may be manifestations of this sampling problem.

Results and assessment of reduction and tool analyses

The reduction analysis indicates that primary reduction for some of the volcanics and cherts from the Newton's Point site, and some of the fine quartzites, cherts, and the translucent hornfels from the Baird site, was carried on elsewhere. If one accepts the premise that primary reduction occurs at or near the quarry site (i.e.: the source of the material), then this pattern implies that the sources of these materials are at some distance from the site. However, this interpretation raises several issues. Few quarry sites in the Maine/Maritimes area have been studied, and the relationship between quarries and reduction in this region is poorly understood. Furthermore, none of the lithic materials from the GMA could be demonstrated to have been recovered from any of the quarry sites that have been studied in the Maine/Maritimes area. Most of the lithic materials in GMA assemblages could have been obtained from local secondary sources, such as beaches, making patterns of lithic procurement, quarrying and primary reduction difficult to observe. The lithic reduction analysis does not account for pieces that may have been reduced as beach cobbles on the spot, and if the landward portions of sites were logical places for reducing stone to keep debitage out of habitation areas, as has been suggested above, beaches would have been as good or better.

The issue of what constitutes a local source is also fundamental to the discussion of lithic reduction and procurement. The Whale Cove chert source is approximately 20km by boat (or 12km linear distance) from Newton's Point. Would unreduced cobbles or quarried blocks have been transported to Newton's Point for primary reduction or would they have been partially reduced at Whale Cove? If the latter occurred, this would create a pattern suggestive of exchange, although this is obviously not the case, based on our understanding of the cultural history of the Maine/Maritimes area. These issues highlight the need to the develop terminology and analyses which differentiate between sources immediately adjacent to the site, sources within the region (which are accessible during seasonal rounds or regular forays), sources from neighbouring regions, and sources removed the site by several regions. It is also essential that the full sequence of lithic procurement (from quarry to finished tool) is adequately understood for potentially exotic materials in the Maine/Maritimes area before the lithic material from the GMA can be placed in a regional perspective.

Implication for lithic exchange studies

These analyses have demonstrated that there are many factors that complicate the study of lithic procurement and exchange. Traditional techniques, such as petrographic and reduction analyses are superficially straightforward, but may be constructed on weak foundations. Indeed, the problems that have been encountered during the analysis of the GMA lithic assemblage suggest a reconsideration of the concept of lithic exchange in the Maine/Maritimes area. Certainly lithic exchange narratives are a tempting research avenue. They are loaded with cultural implications (increasing complexity), involve the integration of geographical, geological, and historical information with discrete, manageable study units (lithic assemblages), and are motivated by the desire to understand large-scale, regional patterns. Is the attraction of these narratives altering our ability to perceive these patterns?

Although many confounding factors were discovered during the GMA analyses, it is premature and ill-conceived to reject all of the evidence for regional lithic exchange in the Maine/Maritimes area. The GMA lithic assemblage was small, and potentially exotic materials exhibited enough variability from the archaeologically recognized exotic types to warrant thin-sectioning for verification. Sites such as Goddard contain more convincing evidence of regional exchange. The quantity of potentially exotic materials, and the lack of similar lithics from other CCM sites and known quarries lend a great deal of credibility to the interpretation that these are "culturally exotic". Furthermore, while some exotic materials (MBC and MUN in particular) are easily misassigned, others, such as Ramah Bay quartzite (RAM) and Mount Kineo rhyolite (KIN), exhibit macroscopic traits that are more readily identifiable and less easily confused with locally available materials. These have a distribution in the northeast that is not explicable by fortuitous dispersal or coincidence.

Chapter 6
CONCLUSIONS

The purpose of this thesis has been fourfold:

(i) to compile all of the data about prehistoric archaeology in the Grand Manan archipelago,
(ii) to use these data to construct a framework for prehistoric cultural history for the Grand Manan archipelago,
(iii) to evaluate existing interpretations about Grand Manan prehistory, and
(iv) to integrate these into a larger regional perspective.

In this chapter, I summarize a cultural history of the Grand Manan archipelago, and discuss the implications of the archipelago's archaeological record for regional models of prehistoric settlement and economic interaction.

SUMMARY

The Maine/Maritimes area is a mosaïc of archaeological regions. Some of these regions have been studied through in-depth and long-term survey and excavation programs; other regions remain virtually unexplored. As the cultural histories of specific regions have become better developed, researchers have attempted to expand local cultural histories into regional narratives. In these regional narratives, the potential role of the Grand Manan archipelago either has been glossed over or dismissed entirely. Prior to the GMAP II, these interpretations were predicated upon the assumption that the Grand Manan archipelago is a barren and forbidding island, that had little to offer prehistoric peoples. Poor integration of the existing archaeological information and limited formal archaeological survey have done little to dispel these misconceptions.

In this thesis, a foundation and context for prehistoric settlement in the archipelago have been outlined. This involved an examination of both present and past environments, and the organic and inorganic resources that would have been a part of them. Geological resources, such as copper and fine-grained tool-stone, are widely available on the beaches and in the bedrock of the GMA. Biological resources, including migratory birds, small terrestrial mammals, varied plant resources, freshwater fish, and a diversity of marine life are abundant. Contrary to the assumption in the archaeological literature of the Maine/Maritimes area, these resources suggest that the Grand Manan archipelago would have appealed to prehistoric foragers, either as a source for materials and foodstuffs, or as a stopping place during long-distance travels or as a part of seasonal rounds. As a part of the process of foundation-building, previous archaeological research and the history of use of the archipelago by the Passamaquoddy people were reviewed.

Although the impression of researchers has been that there is little archaeological evidence for prehistoric human exploitation of the Grand Manan archipelago, this opinion was largely a result of the lack of integration of information that exists in the form of private and public collections, oral and unpublished accounts, and archaeological sites. During the GMAP II, these data were assembled and examined. The quantity of material was greater than expected, which may be a result of the broad methodological approach, or because the expectations were predicated on misconceptions about the archaeological productivity of the Grand Manan archipelago. The archaeological data from the archipelago suggest human habitation possibly as early as 7000 years ago. By the Late and Terminal Archaic periods, ca. 5000 to 3000 bp, there may have been more intensive exploitation or settlement in the archipelago, as is suggested by increased quantities of Late and Terminal Archaic artifacts in private and public collections. The high rate of coastal erosion in the Bay of Fundy, which is particularly acute on the Grand Manan archipelago, is responsible for the lack of extant archaeological deposits from these periods. As a result, evidence for early human activities is restricted to artifacts residing in private and public collections.

There is a greater quantity and quality of evidence for settlement in the Grand Manan archipelago during the Maritime Woodland period (ca. 3000 to 500 bp). In addition to private and public collections of artifacts, there are several extant archaeological sites with Maritime Woodland components. Two of these, the Newton's Point site (BeDq-11) and the Baird site (BdDq-3) were partially excavated during the GMAPII.

The Baird site was settled during the Middle Maritime Woodland period, as indicated by a single radiocarbon date (1860 to 1400 BP). Although there were likely other periods of occupation, insufficient material was recovered to allow them to be identified. The Baird site produced an assemblage of lithic materials, several bone artifacts, and the remains of food stuffs (bones and marine shell). Unfortunately, none of the artifacts are diagnostic of a particular time period. The excavations revealed that portions of the Baird site are significantly disturbed, but that some portions of the site remain relatively intact.

The site itself is an extensive, shallow shell-bearing site similar in structure to other Middle and Late Maritime Woodland shell-bearing sites in the Quoddy region, and the Central Coast of Maine. However, unlike typical coastal prehistoric sites, the Baird site is more than 90m from the present high water line. Only one other known site, the Pendleton Passage site on Deer Island, in the Quoddy region, has a similar location. These anomalies suggest that they may be a type of site that is poorly recognized due to the low visibility of prehistoric sites in similar, but uneroding and undisturbed locations.

The Newton's Point site is a Late Maritime Woodland non-shell site dating to between 1050 and 1130 bp, similar to the type referred to in the regional literature as a "black soil midden". It contains several small, oval features represented by black staining, and high frequencies of lithic debitage. The site produced a number of bifaces and projectile points, but only one thumbnail scraper, and two fragmentary sherds of prehistoric ceramic. The structure of the features, and the resulting radiocarbon date and artifact assemblage, are similar to some other sites and components in the Maine/Maritimes area. The evidence from Newton's Point, taken in combination with the regional evidence, suggests that this type of feature is indicative of a lithic working area, or workshop, and is not an unusual manifestation on coastal Late Maritime Woodland sites.

IMPLICATIONS

The information collected and analysed during this research demonstrates that previous interpretations of the significance of prehistoric settlement in the Grand Manan archipelago were incorrect. The Newton's Point and Baird sites are similar in structure and composition to other regional Maritime Woodland sites. The extent of the Baird site indicates that it was a significant encampment in the past perhaps repeatedly reoccupied over a long period of time, and not a short-term casual settlement, as had been previously inferred. The Newton's Point site produced artifacts and features similar to those in other coastal sites in the Maine/Maritimes area, which suggests that the people who lived at Newton's Point may have participated in the Late Maritime Woodland period exchange system and other forms of regional interaction.

Both the Baird site and the Newton's Point site produced a variety of lithic materials that were used as flaked tool-stones. The Grand Manan Petrographic Series, based on the macroscopic identification of types and their association with potential sources, proved to be problematical. The difficulties relate to the assumption that visible characteristics can be easily and directly associated with geographically-specific sources. Although the analysis of lithic debitage suggested that some materials were being brought to the site as blanks and preforms, a characteristic of the reduction of exotic materials, none of the tool-stones recovered during GMAP II are demonstrably exotic. All of them could potentially be from local primary and secondary sources.

Although some of the lithic materials are macroscopically similar to exotic material types identified elsewhere in the Maine/Maritimes area, in many cases microscopic assessment of thin-sections indicates that these are superficial rather than real similarities. This was particularly the case with lithics resembling Munsungun Ordovician mudstones, but was also encountered with some materials resembling basalt-associated Minas Basin-like cherts.

Furthermore, during the GMAPII the presence on Grand Manan of silicified volcanics in Jurassic-aged basalt host rocks was confirmed in beach cobbles from Whale Cove. These silicified volcanics are petrographically similar in thin-section to silicified volcanics from the Jurassic/Triassic-aged basalts of the Minas Basin area of Nova Scotia. However, they are macroscopically somewhat different from generally recognized variants of Fundy Group basalt-associated cherts. Artifacts and debitage were recovered from Newton's Point which could be made from Whale Cove chert.

This discovery may be a significant confounding factor for interpretations of Late Maritime Woodland lithic exchange systems for two reasons:

(i) the Grand Manan archipelago is now recognized to have been a potential source area for cherts; and

(ii) cherts in collections and assemblages from Maine and the Maritimes that have been attributed to sources in the Minas Basin area of Nova Scotia may in fact be from the Grand Manan archipelago.

These findings have implications for the interpretation of the Newton's Point site as well. The features and lithic assemblage from the Newton's Point site are similar to those encountered on Late Maritime Woodland sites elsewhere in the Maine/Maritimes region. However, unlike other regional sites, none of the lithic materials from Newton's Point are identifiable categorically as exotic types. Given the diversity of local and possibly exotic types in the assemblage recovered from the Newton's Point "lithic workshop", four interpretations can be suggested:

(i) local materials were being reduced as a part of local subsistence-related activities;

(ii) local materials were being reduced for economic use in regional exchange systems;

(iii) exotic-appearing local materials were being reduced for economic use in regional exchange systems; or

(iv) exotic materials were being obtained and reduced for local economic use and/or regional exchange.

The lithic debitage and petrographic analyses suggest that some or all of these activities may have been pursued at Newton's Point. Further analyses of Whale Cove cherts and other local Grand Manan materials will assist in characterizing them, and will allow them to be identified more readily in collections and assemblages from elsewhere in the Maine/Maritimes area.

The archaeological evidence presented in this thesis challenges the notion that the Maine/Maritimes area is composed of a few isolated regions of rich archaeological potential, interspersed by uninhabited, inhospitable reaches. The information derived from collections and sites indicates that artifact types, patterns of settlement, site structure, and lithic materials from the Grand Manan archipelago are comparable to information from both the Quoddy region, and the Central Coast of Maine. However, assemblages from Late Maritime Woodland components have some distinctive characteristics, suggesting that while the archipelago may have served to link the Quoddy region and the Central Coast of Maine, and even the southwest shore of Nova Scotia, the prehistory of the Grand Manan archipelago must be considered to represent a distinctive aspect of the rich cultural history of the Maine/Maritimes area.

Appendix A

An Excerpt from Baird's Journal from 1869 (The Expedition to Grand Manan)

Wednesday, August 18: Arranged an expedition to Grand Manan to see the birds and study the shell beds. Party consisted of Mr. Elias Kinney, my landlord, Prof. Webster (Marine Zoologist) of Union College [Schenulady?] and Edgar Hallet of Eastport. Hired a schooner of 16 tons; two men [funding] themselves for 3.00 per day in all. The wind being down, accepted the offer of Capt. Treadway of US Revenue Cutter Mosswood to tow us over. Which was done in 2 1/2 hours dropping us at Spreggs Cove. Went ashore and got carriage down to Woodwards Cove, where all spent night; the Schooner getting [down] during night. Stopped at Mr. Smalls.

Thursday, August 19: In morn. went to boat and Mr. Simeon J. Cheney our guide, a person thoroughly acquainted with the waters and its inhabitants. Came a board and piloted us to the South side of Cheney Island where [we found two] shell heaps. These were [?] in little piles on upland not connected; and had no bones in them; found a few broken arrows. Got back to Mr Cheney's house on Nantucket Island, where all went to [?] except crew of vessel S.

Friday August 20: Fog, wind and rain all day. Storm stayed in house.

Saturday, August 21: Sky clear and calm. In Mr. Cheney's boat through "Thoroughfare" to Grand Harbour where found shell heaps on Newton's Point and Ingall's Head. Here a continuous layer under the sod: shells much [?]. Found many bones of seal, [?] birds, fish, and numerous stone arrows. Went to White Head Island rock, where clambered through cleft of rocks etc. Returned to Cheney.

Sunday, August 22: Clear and bright all day on the Islands

Monday, August 23: Clear. In small boat with Mr. Cheney to Two Islands, landing on the outer one, where found Uria gylle and Thalassidroma leachii breeding: saw young of both species. Returned by 3 Islands, land on the outer and walking down to Indian Beach where arranged with Indian to prepare skin and skeletons of porpoise, seal. Back via outside of White Head Island.

Tuesday August 24: Very light breeze all day. Left Nantucket at 7:30 for Eastport in Schooner. Did not get over till 9:30 P.M. Found all well.

Appendix B
Work Schedule, GMAP II

Work Period	Total # crew	Task
W1 (5 days)	6	Foot survey, South Brook Beach, Eel Brook & beach, Money Cove, Beal's Eddy Pond, Dark Harbour, Deep Cove, Long Pond, Grand Harbour Surf. Coll. Newton's Point
W2 (5 days)	6	Survey Seal Cove, Ross Island Surf Coll Indian Camp Point Tested Newton's Point
W3 (4 days)	5	Tested Newton's Point
W4 (5 days)	3	Excavated Newton's Point
W5 (6 days)	3	Survey Seal Cove beach Excavated Newton's Point
W6 (5 days)	3	Excavated Newton's Point
W7 (5 days)	8	Survey Red Point, Fish Head, Whale Cove Excavated Newton's Point
W8 (11 days)	4	Survey Cheney Island Excavated Baird site
W9 (4 days)	4	Excavated Newton's Point
W10 (2 days)	3	Survey Kent Island

Appendix C
The Grand Manan Petrographic Series (GMPS)

Designation: GM01
Category: QTZ - Quartz
Macroscopic Description: Semi-translucent to translucent quartz; occasional milky white patches; occasional surface stains and coloured streaks; smooth to irregular pebble cortex; some reddish staining on pebble cortex and exteriors; subconchoidal to irregular fracture.
Occurrence: BeDq11 (N = 86; wt = 134.7g)
BdDq3 (N = 14; wt = 11.7g)
Type Specimen: BeDq11: 619
Source: Occurs as local beach pebbles, in glacial deposits and local bedrock sources.

Designation: GM02
Category: QTZ - Quartz
Macroscopic Description: Semi-translucent to opaque, milky-white quartz; irregular to rough pebble cortex; frequent stained streaks and fractures; frequent coloured patches and inclusions; fracture subconchoidal to irregular.
Occurrence: BeDq11 (N = 41; wt = 497.78g)
BdDq3 (N = 0)
Type Specimen: BeDq11: 765
Source: Occurs as local beach pebbles, in glacial deposits and local bedrock sources.

Designation: GM03
Category: QTZ - Quartz
Macroscopic Description: Tranclucent to tranparent glass-like quartz.
Occurrence: BeDq11 (N = 3; wt = 2.15g)
BdDq3 (N = 2; wt = 0.5g)
Type Specimen: BeDq11: 411
Source: Occurs in patches in coloured quartzes; outcrops containing crystal quartz occur on Whitehead Island and Ross Island (see Gesner 1981: 20-21)

Designation: GM04
Category: CQ - Coarse Quartzites
Macroscopic Description: Tan-brown to dark brown medium fine-grained quartzite; 'sugary' texture at 10X; smooth pebble cortex; conchoidal fracture; occasional very small mica crystals; the brown colour grades into red; may grade into other quartzites; almost certainly a variant of the grey quartzite (GM05)
Occurrence: BeDq11 (N = 110; wt = 665.45g)
BdDq3 (N = 32; wt = 44.3g)
Type Specimen: BeDq11: 1
Source: Available as beach pebbles and cobbles; glacial sources possible (see below)

Designation: GM05
Category: CQ - Coarse Quartzites
Macroscopic Description: Light grey to medium-grey to tan coloured medium-fine-grained quartzite; smooth grey or brown pebble cortex; conchoidal fracture occasional patches of darker coloured minerals; may grade into brown quartzite at pebble edges. See Description: of GM04 for details.
Occurrence: BeDq11 (N = 23; wt = 89.2g)
BdDq3 (N = 0)
Type Specimen: BeDq11: 237
Source: Doyle (1995) and MacDonald (1994: 167) indicate that some yellow quartzites may be exotic to the Gulf of Maine; these quartzites variants are not the same, and are locally available as pebbles and cobbles on beaches; there may also be glacial and bedrock sources.

Designation: GM06
Category: CQ - Coarse Quartzites
Macroscopic Description: Medium to fine-grained grey quartzite with red patches,

areas or reddish cast throughout at 10X magnification; conchoidal fracture; occasional patches of darker minerals; probably grades into grey quartzite (GM05) and brown quartzite (GM04)
Occurrence: BeDq11 (N = 20; wt = 20.35g) BdDq3 (N = 1; wt = 0.5g)
Type Specimen: BeDq11: 852
Source: Occurs as local beach pebbles, in glacial deposits and local bedrock sources.

Designation: GM07
Category: CQ - Coarse Quartzites
Macroscopic Description: Fine-grained pale red to dark red quartzite; conchoidal fracture; semi-translucent. This type may grade into brown quartzite (GM04)
Occurrence: BeDq11 (N = 1; wt = 0.3g) BdDq3 (N = 1; wt = 1.3g)
Type Specimen: BeDq11: 1014
Source: May occur as beach pebbles and cobbles; bedrock and glacial sources possible.

Designation: GM08
Category: FQ- Fine Quartzites
Macroscopic Description: Fine-grained, translucent to semi-translucent, blue/blue-grey/grey quartzite; conchoidal fracture; occasional reddish (cortical?) areas.
Occurrence: BeDq11 (N = 29; wt = 37.6g) BdDq3 (N = 0)
Type Specimen: BeDq11:698, BeDq11: 699 (2 specimens)
Source: Probably available locally as beach pebbles and cobbles; glacial and bedrock sources possible

Designation: GM09
Category: LV - Light (fine-grained) Volcanics
Occurrence: BeDq11 (N = 6; wt = 6.85g) BdDq3 (N = 0)
Type Specimen: BeDq11: 910, BeDq11: 911 (2 specimens)
Macroscopic Description: Very fine-grained greenish-gray opaque volcanic or chert; conchoidal fracture; no visible crystals; occasional small circular patches of stony, rust-coloured material, possibly oxidized iron mineral; may be a variant of greenish felsic volcanic

Designation: GM10
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Extremely fine-grained green to grey-green flow banded rhyolite; glassy, semi-translucent in thin edges; conchoidal fracture; no visible crystals
Occurrence: BeDq11 (N = 1; wt = 7.0g) BdDq3 (N = 0)
Type Specimen: BeDq11: 476

Designation: GM11
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Extremely fine-grained dark green felsic volcanic; brecchiated? - fine angular 'chunks' of black and white materials; strong irregular cortex; bleached outer pebble surfaces
Occurrence: BeDq11 (N = 4; wt = 78.0g) BdDq3 (N = 0)
Type Specimen: BeDq11: 464

Designation: GM12
Category: RTC - (Red) Translucent Chert
Macroscopic Description: Reddish-orange translucent chert; mottled patches with faint streaks; conchoidal fracture; clear spots and dark patches in transmitted light.
Notes: A specimen was thin-sectioned, and this revealled that it was a silicified volcanic. It contained remnant rectangular shapes, which may be fossilized feldspars; it may also contain some plagioclase and some relict phenocrysts. It did not contain spherulitic silica — all of the silica was fine-grained and fibrous, and there was no visible zoning
Occurrence: BeDq11 (N = 13; wt = 6.55g) BdDq3 (N = 2; wt = 0.7g)
Type Specimen: BeDq11: 16, BeDq11: 17 (2 specimens)

Thin-section: BeDq11: 798
Source: Microscopically similar to Minas Basin chert and Whale Cove chert

Designation: GM13
Category: FC - Fine Cherts
Macroscopic Description: Red opaque chert with micrograins; small clear patches (show up red because of the groundmass); occasional white (probably feldspar) crystals; the material grades into a stonier, irregular banded area of grey, red and translucent chert fragments (a low quality mottled chert)
Notes: Lucy Wilson suggests this may be within the range of Whale Cove and Minas Basin chert
Occurrence: BeDq11 (N = 3; wt = 2.9g) BdDq3 (N = 0)
Type Specimen: BeDq11: 909

Designation: GM14
Category: SM -Siltstones & Mudstones
Macroscopic Description: An extremely fine-grained dark red to reddish-purple volcanic; flat white coloured surfaces; subconchoidal to blocky fracture.
Notes: Macroscopically similar to BI16 and red Munsungun/Ordovician chert. However, a macroscopically similar beach specimen was thin-sectioned, and this reveailed that the sectioned sample (BeDq11: 10) is of volcanic origin. It contains very small plagioclase grains, lots of iron, and is probably weathered. Sectioning reveailed that the specimen is extremely fine-grained, and slightly banded, which may be the result of formation or weathering processes. It contains a band of globular clusters which may possibly be calcite, which implies a basaltic origin.
Occurrence: BeDq11 (N = 4; wt = 356.9g) BdDq3 (N = 2; wt = 0.7g)
Type Specimen: BeDq11: 1139
Thin-section: BeDq11: 10

Designation: GM15
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Grey to black mottled chert or volcanic with stony bleached cortex; cross-cutting veins of quartz crystal. Not all pieces are mottled, as some are completely black; some translucent areas on extreme thin edges; conchoidal fracture.
Notes: Macroscopically GM15 is similar to Touladie chert. The specimen which as thin-section was a very, very fine grained volcanic, either a dacite or a rhyolite. It contained a bit of iron and quartz, and quartz veins. It also contained some very fine biotite, and long thin feldspars. It was slightly fibrous, with mica, biotite and muscovite.
Occurrence: BeDq11 (N = 78; wt = 54.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 41
Thin-section: BeDq11: 571

Designation: GM16
Category: QTZ - Quartz
Macroscopic Description: Dark blue-grey bull quartz with smooth to irregular pebble cortex; cortex is yellow- to brown-tinged; subconchoidal fracture.
Occurrence: BeDq11 (N = 1; wt = 1.1g) BdDq3 (N = 0)
Type Specimen: BeDq11: 1028

Designation: GM17
Category: MISC - Miscellaneous
Macroscopic Description: A fine-grained salmon-coloured granitoid, with smooth pebble cortex; colour darker toward outside of pebble; non-conchoidal (hexagonal to irregular) fracture.
Note: David Black indicates that this type is probably the same as BI35
Occurrence: BeDq11 (N = 1; wt = 3.5g) BdDq3 (N = 0)
Type Specimen: BeDq11: 951

Designation: GM18
Category: MQ - Miscellaneous Quartzites
Macroscopic Description: A coarse stony grey-brown quartzite with blocky to

subconchoidal fracture; occasional patches of reddish softern minerals

Occurrence: BeDq11 (N = 3; wt = 24.6g) BdDq3 (N = 0)

Type Specimen: BeDq11: 226

Source: Probably available as beach pebbles and cobbles; also probable bedrock and glacial sources.

Designation: GM19

Category: MRBC - Mottled Red-Brown Chert

Macroscopic Description: Mottled dark to light purple-brown chert; waxy to stony texture; blocky to conchoidal fracture; contains occasional patches of grey translucent chert; streaks and patches of clear crystals (quartz?); translucent only at thinnest edges; occasional reddish and brown translucent grains

Notes: Macroscopically this type is very similar to hand-specimens collected from Minas Basin. However, a specimen was thin-sectioned, which revealled that this is a silicified sedimentary rock, possibly a silicified limestone. The sectioned specimen was very silicious, and contained occasional detrital quartz grains, which exhibited undulatory extinction; this showed that some of the quartz was in a metamorphic rock as some time in the past. The section also revealled some areas of very coarsely crystalline silica; a large amount of iron staining was visible, especially at the boundary of areas, and around spots of iron minerals. No fossils were observed.

Occurrence: BeDq11 (N = 5; wt = 10.8g) BdDq3 (N = 0)

Type Specimen: BeDq11: 1120 to 1123 (4 specimens)

Thin-section: BeDq11: 1124

Designation: GM20

Category: FC - Fine Cherts

Macroscopic Description: A very fine-grained blue-grey chert; faint sugary texture at 20X magnification, so could concievably be an extremely fine-grained quartzite; conchoidal fracture; flat smooth cortex bleached light green

Occurrence: BeDq11 (N = 7; wt = 14.9g) BdDq3 (N = 0)

Type Specimen: BeDq11: 194; BeDq11: 1182 (2 specimens)

Designation: GM21

Category: FC - Fine Cherts

Macroscopic Description: An extremely fine-grained, grey-green translucent chert; some areas nearly white; narrow veins of small clear crystals cross-cutting the material; conchoidal fracture

Occurrence: BeDq11 (N = 2; wt = 6.1g) BdDq3 (N = 8; wt = 7.8g)

Type Specimen: BeDq11: 464

Designation: GM22

Category: CC - Coarse Cherts

Macroscopic Description: A mottled, semi-translucent, multi-coloured chert, with deep bright red, and semi-translucent white patches; waxy texture; conchoidal fracture; some pieces duller in colour, fracture less conchoidal, some grains of opaque chert

Notes: David Black indicates that this is vaguely similar to some of the Minas Basin multicoloured cherts; Lucy Wilson indicates that it falls within the likely range of variation for Minas Basin chert and Whale Cove chert

Occurrence: BeDq11 (N = 4; wt = 4.4g) BdDq3 (N = 0)

Type Specimen: BeDq11: 635; BeDq11: 1176 (2 specimens)

Designation: GM23

Category: CC - Coarse Cherts

Macroscopic Description: A pinkish-white mottled to granular, semi-translucent to opaque chert; mosaic of frosted, white, pink patches; subconchoidal fracture; waxy lustre; no obvious cortex

Occurrence: BeDq11 (N = 3; wt = 7.9g) BdDq3 (N = 0)

Type Specimen: BeDq11: 1177

Designation: GM24
Category: CC - Coarse Cherts
Macroscopic Description: A semi-translucent blue-grey-beige amorphous chert; waxy lustre; frequent flaws, cracks and small pore spaces
Occurrence: BeDq11 (N = 2; wt = 1.5g) BdDq3 (N = 0)
Type Specimen: BeDq11: 407; BeDq11: 12 (2 specimens)

Designation: GM25
Category: CC - Coarse Cherts
Macroscopic Description: Banded, red and beige, semi-translucent to translucent chert; waxy lustre; occasional patches of clear (quartz?) crystals; conchoidal fracture; occasional coarser stonier patches; some areas maybe more mottled than banded, with whiter patches; in places almost moss-agate-like.
Notes: Lucy Wilson indicates that this material falls within the expected range of material from Minas Basin, and possibly Whale Cove.
Occurrence: BeDq11 (N = 15; wt = 10.0g) BdDq3 (N = 2; wt = 0.6g)
Type Specimen: BeDq11: 229; BeDq11: 230 (2 specimens)

Designation: GM 26
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: Chalky to milky white micro-crystalline material; probably a beached volcanic, although some areas more 'cherty' that volcanic-like; some crystals and patches of darker grains visible; original colour possibly in the green to brown range
Notes: David Black indicates that this is probably the same BI20
Occurrence: BeDq11 (N = 1; wt = 0.6g) BdDq3 (N = 0)
Type Specimen: BeDq11: 263

Designation: GM27
Category: PV - Porphyritic Volcanics
Macroscopic Description: Fine-grained, rhyolitic porphyritic volcanic, with reddish-brown ground mass and orange feldspar phenocrysts; also occasional mafic mineral grains
Occurrence: BeDq11 (N = 1; wt = 0.9g) BdDq3 (N = 0)
Type Specimen: BeDq11: 2

Designation: GM28
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A very fine-grained bleached material, probably volcanic with brown or grey irregular patches that are less bleached; may be occasional very small crystals; occasional rust-coloured patches or staining on some pieces; conchoidal to subconchoidal fracture; occasional linear flaws. Cortex similar to interior of the rock: white, matte finish, with the spots. Some pieces have very thin cross-cutting streaks or bands of translucent (rather than opaque) material.
Occurrence: BeDq11 (N = 221; wt = 233.05g) BdDq3 (N = 0)
Type Specimen: BeDq11: 647; BeDq11: 650; BeDq11: 67 (3 specimens)

Designation: GM29
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A very fine-grained bleached material, probably volcanic; may occasionally contain very small crystals; conchoidal to subconchoidal fracutre; occasional linear flaws. Cortex similar to interior of rock: white, matte, finish.
Notes: Very similar to GM28, without the spots. Probably the same material.
Occurrence: BeDq11 (N = 147; wt = 118.94g) BdDq3 (N = 1; wt = 1.4g)
Type Specimen: BeDq11: 965

Designation: GM30
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A very fine-grained bleached grey material, probably volcanic, with thin darker bands, (flow banding?) and circular to irregular sporadic vessicles filled with rusty red-brown powder

material; conchoidal fracture; some patches of bluish cherty material - brecchia?. Some pieces may have flat bleached cortex
Occurrence: BeDq11 (N = 38; wt = 49.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 1030

Designation: GM31
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A very fine-grained opaque grey (bleached) volcanic; macroscopic mottling in lighter and darker greys; microscopic banding (flow-banding?) of more or less translucent materials; some very small crystals; conchoidal fracture
Occurrence: BeDq11 (N = 32; wt = 50.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 288

Designation: GM32
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A very fine-grained opaque grey volcanic; bleaches to stony white; very small crystals visible; no obvious banding, no large phenocrysts, no obvious vessicles; conchoidal fracture
Occurrence: BeDq11 (N = 5; wt = 8.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 340

Designation: GM33
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A fine-grained dark grey to black mafic volcanic; slight translucency on extreme thin-edges; conchoidal fracture; slightly rough texture, even at low magnification; bleaches lighter on cortex; bleaching reveals lighter coloured streaks; occasional cross-cutting veins of white material (quartz).
Occurrence: BeDq11 (N = 67; wt = 161.35g) BdDq3 (N = 6; wt = 1.3g)
Type Specimen: BeDq11: 703; BeDq11: 705; BeDq11: 277 (3 specimens)

Designation: GM34
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A fine-grained grey to blue-grey bleached volcanic; some very small crystals (mica?); some patches of darker material; some vessicles containing reddish material; conchoidal fracture, numerous flaws
Occurrence: BeDq11 (N = 9; wt = 7.3g) BdDq3 (N = 0)
Type Specimen: BeDq11: 990; BeDq11: 996 (2 specimens)

Designation: GM35
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Blue-grey bleached volcanic; very fine-grained; occasional vessicles; occasional vessicles filled with red powdered material; one clear glass phenocryst reminiscent of those in 'Kineo' felsite. Otherwise no visible crystals; conchoidal fracture
Occurrence: BeDq11 (N = 1; wt = 2.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 1129

Designation: GM36
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Very fine-grained blue-grey bleached volcanic; stoney groundmass peppered with small round spots of glassier blue-grey material (not phenocrysts); no visible crystals; some small vessicles filled with red powdery material; conchoidal fracture; some pieces have a greener tint to the groundmass
Occurrence: BeDq11 (N = 9; wt = 17.2g) BdDq3 (N = 0)
Type Specimen: BeDq11: 1128; BeDq11: 1130; BeDq11: 807 (3 specimens)

Designation: GM37
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A very fine-grained, glassy, opaque volcanic; partly bleached blue-grey; cross-cut by thin veins of crystalline material; some irregular patches of crystalline material; stonier

cortex; no visible crystals; bleaches to white
Occurrence: BeDq11 (N = 8; wt = 14.8g) BdDq3 (N = 4; wt = 2.1g)
Type Specimen: BeDq11: 174; BeDq11: 175; BeDq11: 858 (3 specimens)

Designation: GM38
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A very fine-grained grey-blue volcanic; occasional irregular patches of darker material; some very small visible crystals (possibly mica); subconchoidal fracture; stony rather that glassy texture
Occurrence: BeDq11 (N = 4; wt = 3.1g) BdDq3 (N = 0)
Type Specimen: BeDq11: 173

Designation: GM39
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A very fine-grained greenish grey (bleached?) volcanic; cross-cut with very fine veins of crystal material; some very small visible crystals; occasional very small patches of darker minerals; conchoidal fracture but fracture surfaces always slightly rough at high magnification; cortex is a matte stoney white.
Occurrence: BeDq11 (N = 3; wt = 3.5g) BdDq3 (N = 0)
Type Specimen: BeDq11: 612

Designation: GM40
Category: SM -Siltstones & Mudstones
Macroscopic Description: An extremely fine-grained blue-grey bleached (?) mudstone; interspersed with very, very fine dark and shiny minerals; homogeneous; conchoidal fracture; completely opaque
Occurrence: BeDq11 (N = 2; wt = 2.2g) BdDq3 (N = 0)
Type Specimen: BeDq11: 6

Designation: GM41
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: Very fine-grained, very homogeneous, blue-grey volcanic; some very small crystals visible at high magnification; some very faint alternation of dark and light bands (flow-banding?); conchoidal fracture; cortex flat, stoney grey, often stained rust-red; slight sugary texture even at high magnification; some semi-translucency on very thin-edges
Occurrence: BeDq11 (N = 11; wt = 7.1g) BdDq3 (N = 0)
Type Specimen: BeDq11: 278, 280, 281, 283 to 286 (7 specimens)

Designation: GM42
Category: PV - Porphyritic Volcanics
Macroscopic Description: A very fine-grained volcanic or chert; purple red groundmass with many large white crystals (quartz?)
Occurrence: BeDq11 (N = 1; wt = 0.4g) BdDq3 (N = 0)
Type Specimen: BeDq11: 475

Designation: GM43
Category: MQ - Miscellaneous Quartzites
Macroscopic Description: Very fine-grained grey quartzite; semi-translucent on thin edges; cross-cut by linear flaws (not bands of crystals, more like cracks that have been 'welded' together again); some patches of darker coloured minerals; some vague banding; sub-conchoidal fracture and rough fracture surfaces
Occurrence: BeDq11 (N = 1; wt = 1.1g) BdDq3 (N = 0)
Type Specimen: BeDq11: 857

Designation: GM44
Category: FC - Fine Cherts
Macroscopic Description: A cryptocrystalline dark and light grey mottled chert; basic rock is medium dark grey interspersed with irregular patches of lighter grey material; semi-translucent on extreme thin edges; conchoidal fracture; smooth fracture surfaces
Occurrence: BeDq11 (N = 1; wt = 1.1g) BdDq3 (N = 0)
Type Specimen: BeDq11: 614

Designation: GM45
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A very fine-grained blue-grey chert with thin discontinuous bands of coarser silica cross-cut by well-defined veins filled with coarser, clear crystals. The thin veins cross-cut one another and cross-cut the piece in all directions. They vary considerably in width. the fine-grained areas show variation in the grey-blue range that may indicated relict flow-banding.
Note: This is an unbleached variant of 44?
Occurrence: BeDq11 (N = 2; wt = 4.5g) BdDq3 (N = 0)
Type Specimen: BeDq11: 509; 511 (2 specimens)

Designation: GM46
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A pink to grey chert, with a sugary texture at high magnification; patches of pinker coloured rock; trnaslucent in thin areas; conchoidal fracture and smooth fracture surfaces; "glittery" areas that may be very, very small crystals
Occurrence: BeDq11 (N = 1; wt = 0.8g) BdDq3 (N = 0)
Type Specimen: BeDq11: 42

Designation: GM47
Category: MQ - Miscellaneous Quartzites
Macroscopic Description: White to pink, very fine-grained quartzite; conchoidal fracture; bleaches (?) whiter; opaque.
Note: May be the same as GM18
Occurrence: BeDq11 (N = 5; wt = 5.2g) BdDq3 (N = 1; wt = 6.4g)
Type Specimen: BeDq11: 264, 265 (2 specimens)

Designation: GM48
Category: BVC - Bleached Volcanic or Chert
Macroscopic Description: A fine-grained, light brown volcanic, with many intersecting "linear" patches of whiter material; also may contain small vessicles filled with reddish material or minerals; completely opaque; conchoidal fracture.
Occurrence: BeDq11 (N = 2; wt = 1.7g) BdDq3 (N = 0)
Type Specimen: BeDq11: 172

Designation: GM49
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: Extremely fine-grained volcanic or chert; dark grey groundmass; conchoidal fracture; semi-translucent; faint lighter grey banding (relict flow-banding?), large irregular patches of white, softer material; some empty vessicles; some vessicles or patches of iron-like minerals (red-brown). Cortex is flat, bleached white. Grades into coarser rock.
Note: A specimen was thin-sectioned; the sectioned specimen was an extremely fine-grained volcanic rock, containing a lot of what may have been biotite; the white patches were just more weathered areas of the same material.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 12; wt = 6.95g)
Type Specimen: BdDq3: 115 to 118 (4 specimens)
Thin-section: BdDq3: 29

Designation: GM50
Category: SM -Siltstones & Mudstones
Macroscopic Description: A green-grey mudstone, very fine-grained; opaque and homogeneous; many planes that are very fine and white; conchoidal fracture; cortex appears to be bleached and flat.
Note: The only specimen was thin-sectioned because it was macroscopically similar to the grey-green Munsungun Ordovician chert. The sectioned specimen did have a sedimentary origin, but was otherwise not particularly like the Munsungun mudstone/chert. It was extremely fine-grained and was composed mainly of quartz grains and silica. Most of the silica

was fine, but there were zones of coarser-grained silica. The quartz grains were detrital, suggesting that the rock formed in a sedimentary mud. There was scattered iron, and some fine crystals of what may be calcite. No fossils were observed. The sectioned sample may be a shale or mudstone.

Occurrence: BeDq11 (N = 0) BdDq3 (N = 1; wt = 15.1g)

Type Specimen: BdDq3: 438

Thin-section: BdDq3: 438

Designation: GM51

Category: TH - Translucent Hornfels

Macroscopic Description: White to translucent to transparent chert; extremely fine-grained; conchoidal fracture; contains numerous flaws or inclusions including coarser white patches, black minerals, and clear glassy crystals or patches. The clear glassy patches vary in frequency, but are alway present. Some pieces are transected by sublinear patches or veins or black minerals; where these patches are thick, the minerals may shade into brown or reddish. The groundmass may be tinged (stained) yellow in places. May contain green-grey minerals.

Note: Several specimens from variants of this type were thin-sectioned. The thin-sections revealed that the specimens were composed almost completely of pure fine-grained silica having a fibrous texture (which looks "micaeous?"). The specimens contain zones and bands of silica varying in fineness; they also contain quartz grains which exhibit undulatory extinction; they may contain chlorite, which indicates that these are silicified metamorphic rocks, which could be described as "hornfels".

Occurrence: BeDq11 (N = 1; wt = 0.9g) BdDq3 (N = 50; wt = 21.85g)

Type Specimen: BdDq3: 201

Thin-section: BdDq3: 33, 37, 198

Designation: GM52

Category: FQ- Fine Quartzites

Macroscopic Description: Very fine-grained semi-translucent to translucent grey to blue-grey metamorphic quartzite; frequent black patches or stains that are irregular to linear; patches of clear quartz or quartzite.

Occurrence: BeDq11 (N = 0) BdDq3 (N = 8; wt = 5.15g)

Type Specimen: BdDq3: 162 to 168 (7 specimens)

Designation: GM53

Category: FQ- Fine Quartzites

Macroscopic Description: A fine-grained quartzite (or chert), with a translucent to transparent groundmass, with numerous black, reflective particles throughout.

Occurrence: BeDq11 (N = 0) BdDq3 (N = 1; wt = 0.1g)

Type Specimen: BdDq3: 423

Designation: GM54

Category: CQ - Coarse Quartzites

Macroscopic Description: A pinkish-grey medium to fine-grained quartzite; conchoidal fracture; reddish-grey smooth pebble cortex.

Note: This type may grade into GM04 to GM06

Occurrence: BeDq11 (N = 0) BdDq3 (N = 56; wt = 123.9g)

Type Specimen: BdDq3: 56, 60, 66 (3 specimens)

Source: Available as beach pebbles and cobbles; glacial and bedrock sources possible

Designation: GM55

Category: FQ- Fine Quartzites

Macroscopic Description: A fine-grained dark green quartzite with brown bands; concoidal fracture; semi-translucent on extreme thin edges.

Note: This type may grade into GM04 to GM06

Occurrence: BeDq11 (N = 0) BdDq3 (N = 2; wt = 1.3g)

Type Specimen: BdDq3: 150 to 151 (2 specimens)
Source: Likely available as beach pebbles and cobbles; glacial and bedrock sources possible

Designation: GM56
Category: PV - Porphyritic Volcanics
Macroscopic Description: Weathered purplish-brown volcanic with a mottled brown, purple and wine-red groundmass; large phenocrysts of white feldspar and muscovite mica; some vessicles; rough fracture surfaces; subconchoidal fracture
Note: A specimen was thin-sectioned; the sectioned specimen was a weathered volcanic, either a diabase or a basalt. The rock itself had plagioclase phenocrysts, and fragments of finer-grained basalt embedded in it. These basalt fragment may represent an older volcanic incorporated into a more recent, slower-cooling one. Calcite and iron were present, as a result of the weathering process.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 9; wt = 21.1g)
Type Specimen: BdDq3: 75
Thin-section: BdDq3: 79

Designation: GM57
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A red-brown volcanic or chert; opaque to semi-translucent; the groundmass is very fine-grained, and black-spotted; contains occasional white cross-cutting streaks or veins; conchoidal fracture; cortex is flat and rusty-brown; glassy texture; may contain very small crystals (feldspar?)
Occurrence: BeDq11 (N = 0) BdDq3 (N = 5; wt = 9.4g)
Type Specimen: BdDq3: 431

Designation: GM58
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A striped red-brown rhyolite; flow-banded? or striped brown/red-brown/black; flat brown cortex; subconchoidal fracture; some irregular streaks which contain inclusions of clear glassy material.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 1; wt = 5.6g)
Type Specimen: BdDq3: 432

Designation: GM59
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A very fine-grained black to dark-grey volcanic; contains a few scattered feldspar crystals.
Note: This is most likely a variant of GM33, as it is very similar, except for the feldspar crystals.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 6; wt = 234.1g)
Type Specimen: BdDq3: 127, 128, 134 (3 specimens)

Designation: GM60
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A blue-grey banded (flow-banded?) volcanic; very fine-grained; semi-translucent on thin edges; conchoidal fracture; no visible crystals; 'sugary' texture at high magnifications.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 3; wt = 0.9g)
Type Specimen: BdDq3: 8, 9, 10 (3 specimens)

Designation: GM61
Category: PV - Porphyritic Volcanics
Macroscopic Description: A mottled, probably bleached, grey-green volcanic, with clear glassy crystals; very fine-grained groundmass; may contain white or empty pits; slightly translucent.
Note: This may be very weathered Kineo rhyolite.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 1; wt = 0.4g)
Type Specimen: BdDq3: 25
Source: May be an "exotic", from the Mount Kineo rhyolite source.

Designation: GM62
Category: LV - Light (fine-grained) Volcanics

Macroscopic Description: A very fine-grained grey-green chert or volcanic; semi-translucent to translucent on thin edges; circular to sub-rectangular white patches (leaching?); occasional black spots (minerals?); occasional red staining; occasional fine, shiny crystals; conchoidal fracture.
Note: May be similar to GM11
Occurrence: BeDq11 (N = 0) BdDq3 (N = 8; wt = 6.0g)
Type Specimen: BdDq3: 16 to 17 (2 specimens)

Designation: GM63
Category: DV - Dark (fine-grained) Volcanics
Macroscopic Description: A fine-grained blue-grey volcanic (or siltstone?); occasional large white crystals, probably quartz and small black crystals, probably biotite mica; subconchoidal fracture; opaque; possible flow-banding; cortex same as the rock except smoother (not bleached).
Note: Biotite mica suggests a volcanic origin.
Occurrence: BeDq11 (N = 0) BdDq3 (N = 3; wt = 2.9g)
Type Specimen: BdDq3: 122, 123 (2 specimens)

Designation: GM64
Category: LV - Light (fine-grained) Volcanics
Macroscopic Description: A medium to fine-grained dark purple-red volcanic; sugary, with very small glittery crystals; numerous inclusions and patches, including large subrectangular to irregular lighter patches, feldspar crystals, and black mineral patches (biotite?); veins of lighter material; conchoidal fracture; opaque, except some translucency on extreme thin edges.
Note: This material is only represented by a single projectile point (type specimen)
Occurrence: BeDq11 (N = 1; wt = 2.6g) BdDq3 (N = 0)
Type Specimen: BeDq11: 83

Designation: GM65
Category: RTC - (Grey) Translucent Chert
Macroscopic Description: Translucent mottled red-brown-grey chert; visible patches of clear crystals, probably quartz; rough stony cortex (?); opaque white 'cherty' patches on cortex as well (a product of weathering? burning?)
Note: Thin-sections reveal that this is a chert from a volcanic source. It has a zone of what is clearly basalt, surrounded by spherulitic silica. Lucy feels that it is within the expected range of variation for the Whale Cove/Minas Basin material. The type specimen is the only recovered; it occurred as an unmodified cortical pebble in Feature 2.
Occurrence: BeDq11 (N = 1; wt = 27.4g) BdDq3 (N = 0)
Type Specimen: BeDq11: 187 (3 fragments)
Source: Local?

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22	Ferguson, A.	1988	Indian Point Site - CiDf at MacEacherns Point, Northumerland County New Brunswick
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